

**MODEL P135-20/35
PAPER TAPE PUNCH
OPERATION AND MAINTENANCE MANUAL**

W



Comtec Information Systems, Inc.
53 John Street, Cumberland, R.I. 02864
Phone 401-724-8500 — TWX 710-387-1171

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SECTION I

INTRODUCTION

1.1 GENERAL

The Digitronics Model P135 Paper Tape Punch (Figure 1-1) is a solenoid actuated tape perforator that is capable of punching 5, 6, 7, or 8 level (11/16 inch to 1 inch) paper tape. The Paper Tape Punch is available in two variations: The Model P135-20 which operates at speeds up to 20 characters per second and the Model P135-35 that operates at speeds up to 35 characters per second. Both models use solenoid action for tape movement and for tape perforation.

This section outlines the Model P135 applications, specifications, interface requirements, options, and physical description of the unit.

1.2 APPLICATIONS

The Model P135 can be used as a sub-assembly feature in automatic test systems, business machines, machine tool control equipment, and data communications equipment.

1.3 SPECIFICATIONS

Refer to Table 1-1 for the Model P135 equipment specifications.

1.4 INTERFACE REQUIREMENTS

1.4.1 Drive Signals

The Model P135 Punch uses solenoid linkage action to advance and perforate paper tape. The solenoids have an indefinite life and do not require lubrication. Tape can be advanced and perforated with every input drive pulse received from the customers source through the interface connector located at the rear of the punch.

The standard tape transport advances the tape by means of two tape transport solenoids which are activated simultaneously. This occurs immediately after the bail solenoids pull the punch pins to their home position. The punch pins are operated by individual data/sprocket solenoids. Each solenoid requires a drive pulse of 27±2 volts for specific time duration. The proper drive pulse time durations for the punches are as follows:

a. Data/sprocket punch solenoids:	P135-20	10.5 milliseconds
	P135-35	9.0 milliseconds
b. Transport solenoids:	P135-20	12.5 milliseconds
	P135-35	11.5 milliseconds
c. Bail solenoid:	P135-20	11.5 milliseconds
	P135-35	10.0 milliseconds

In order for the Model P135-35 Paper Tape Punch to achieve 35 characters per second operating speed, back electromotive force (emf) arc suppression (Figure 1-2) is required for the solenoids to ensure

the punch pins are clear of the die and guide housing before the next drive pulse is received. Figure 1-3 illustrates the recommended solenoid driver circuits for the Model P135-35 (with arc suppression) and for the Model P135-20.

NOTE

Because of the lower operating speed, the Model P135-20 Paper Tape Punch does not require an arc suppression circuit in the solenoid driver circuit.

1.4.2 End-Of-Tape

A microswitch is used to provide an external End-Of-Tape (EOT) indication. To enable the external control to stop tape motion when the unit is out of tape, the end-of-tape (EOT) switch will close when the end-of-tape is approximately 2-1/2 inches from the die and guide assembly. The EOT signal is returned to the control source via the interface connector so that tape motion can be stopped by the external control before the punch runs out of tape.

1.5 OPTIONS

The Model P135 Paper Tape Punch assembly is available in a variety of optional Mechanical Packages and Electrical Options as described in the following paragraphs.

1.5.1 Mechanical Options

The punch head assembly is available in a variety of optional mechanical package styles as detailed in Table 1-2 and illustrated in Figure 1-4.

1.5.2 Electrical Options

The Electrical Options for the Model P135 Paper Tape Punch are as follows:

- a. Power Supply - Operates from 115 volt, 60 Hz input and supplies approximately 27 volts to the transport and punch solenoids.
- b. Control Electronics - The control electronics provide the proper timing, sequencing, and driver circuits for Paper Tape Punch operation. The control electronics also includes the front panel controls for POWER ON, REEL MOTOR, TAPE FEED and PUNCH DELETE.
- c. Eight Channel Tape - Provides the necessary solenoids for perforating eight level paper tape when this option is selected.

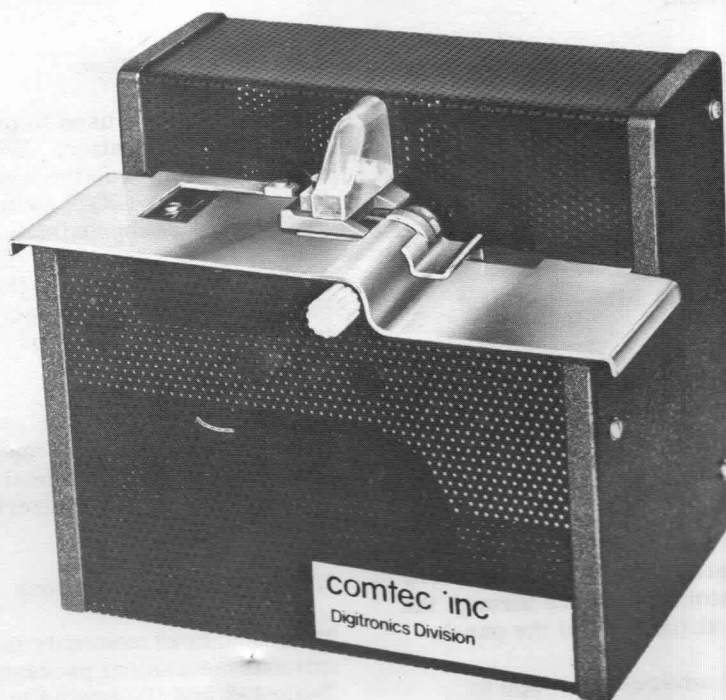


Figure 1-1. Model P135 Paper Tape Punch

The punched output tape meets EIA Specification RS-227 (October 1971).

- d. Advanced Sprocket Teletypesetter Tape - A special punch head capable of punching only six-channel tape with an advanced sprocket. (Refer to options B-2 AMS455 Appendix A)

Table 1-1 Model P135 Equipment Specifications

GENERAL

Standards	meets EIA requirements (RS227 October, 1971)
Tape Types	oiled or unoled paper is recommended. All other types including vulcanized fiber should be used only in light duty applications.
Tape Width	adjustable guides for 5, 6, 7, or 8-level tape (11/16 to 1.0 inch).
Tape Thickness	0.003" to 0.0045" nominal.
Number of Channels	eight plus sprocket hole
Speed	P135-20, 0 to 20 characters per second, asynchronous. P135-35, 0 to 35 characters per second, asynchronous.
Input	parallel by bit, serial by character

POWER AND ENVIRONMENTAL

Power	27 volts dc \pm 2v, 10 amperes peak (code delete)
-----------------	---

TEMPERATURE

Operating	0°C to + 55°C
Non-operating	- 40°C to +70°C

HUMIDITY

Operating	90% maximum over temperature range 0° to 55°C
Non-operating	100% without condensation

PHYSICAL CHARACTERISTICS

Input Connector	Winchester Type XAC34PF2006
Size	6-11/16" H x 7-7/8" W x 5-5/8" D
Weight	9-1/2 pounds
Color	black, rippled finished
End-of-Tape Switch	micro-switch 11SM1-T UL approved, maximum volt 125 to 250 vac maximum, 2.5 amps

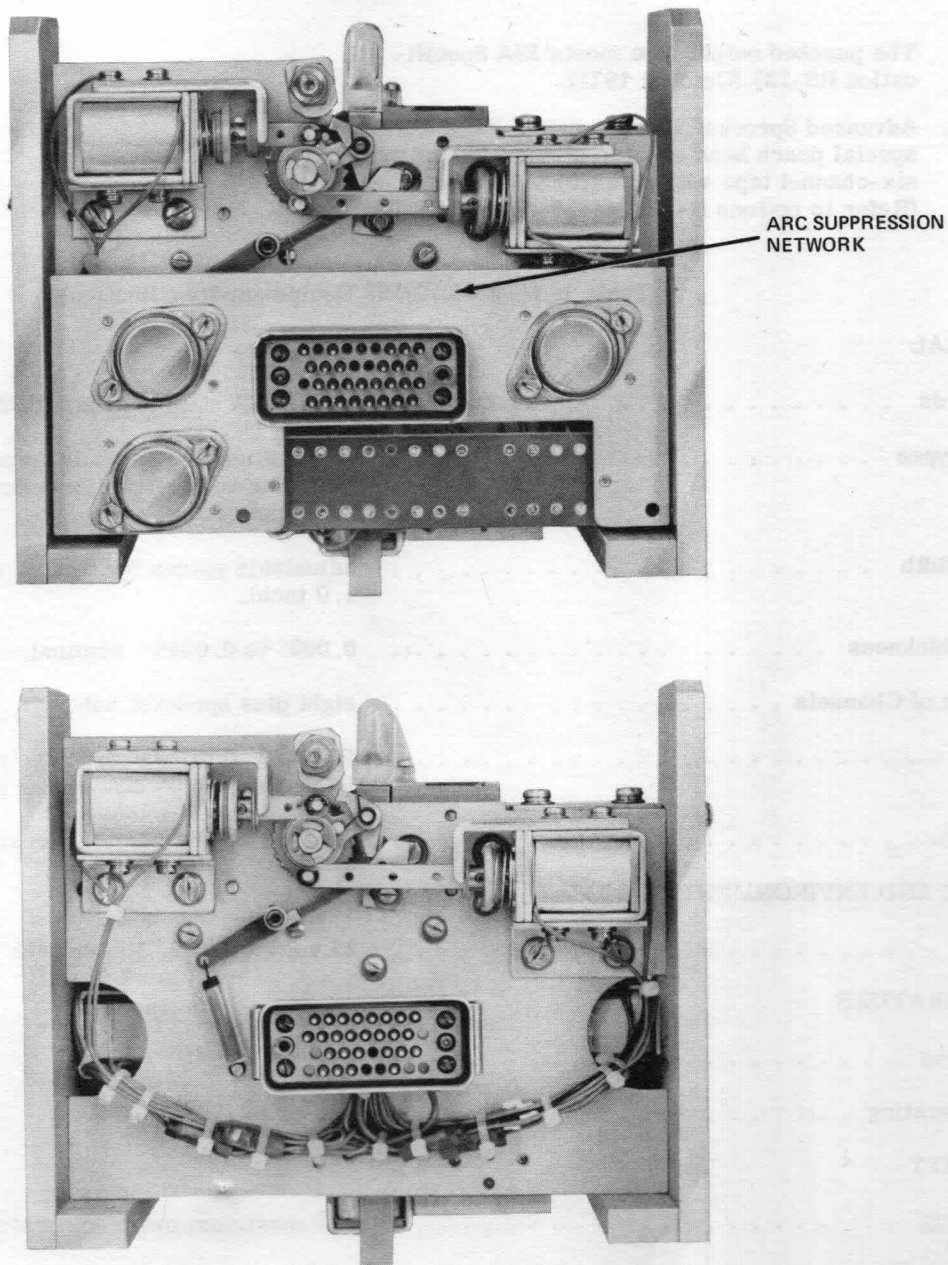
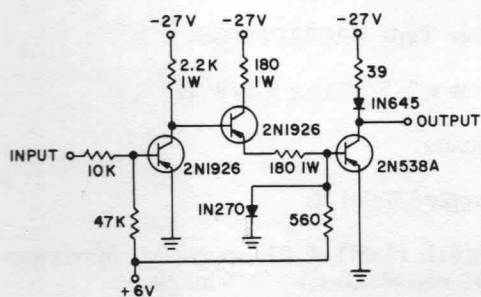
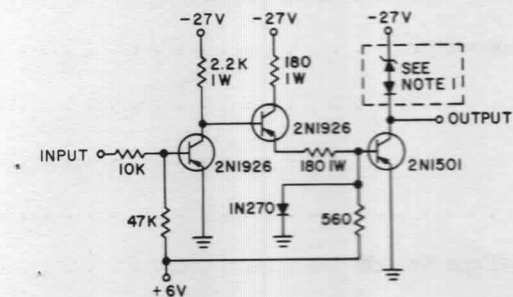


Figure 1-2. Model P135 With/Without Arc Suppression



Model P135-20 Punch



Model P135-35 Punch

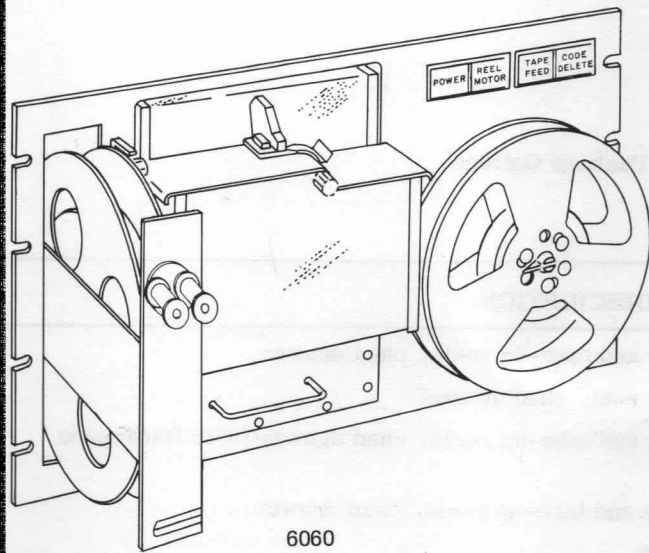
NOTE:

1. Arc suppression network included with P135-35.
2. Logic 1 = $-0.2 \pm 0.2\text{VDC}$
Logic 0 = $-9.0 \pm 3.0\text{VDC}$
3. Unless otherwise specified:
Resistors are 1/2W 5%
Resistance values in ohms

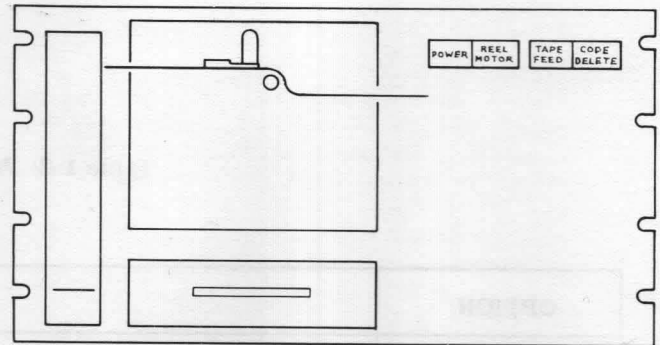
Figure 1-3. Recommended Solenoid Driver Circuit Diagram

Table 1-2 Punch Package Options

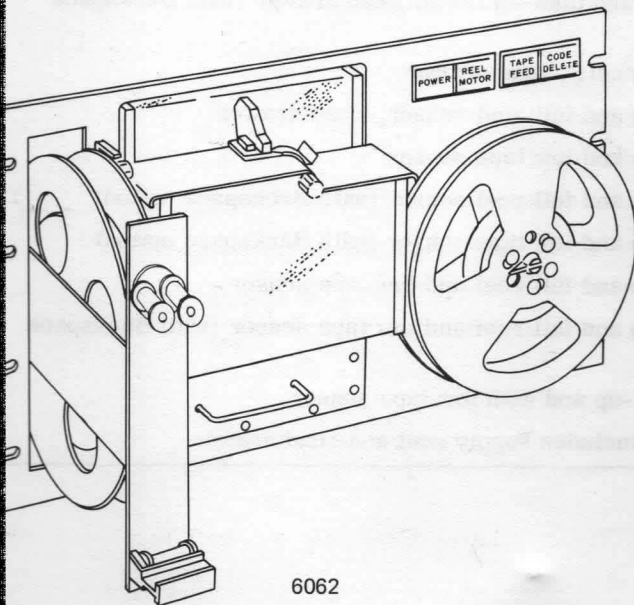
OPTION	DESCRIPTION
6060	10-1/2" panel with supply and take-up reels, chad drawer
6061	10-1/2" panel with supply reel, chad drawer
6062	10-1/2" panel with supply and take-up reels, chad drawer (with Backspace option)
6080	15-3/4" panel with supply and take-up reels, chad drawer
6081	15-3/4" panel with fanfold
6082	15-3/4" panel with supply and take-up reels, chad drawer (with Backspace option)
6083	15-3/4" panel with supply reel, chad drawer
6084	15-3/4" panel with take-up and full reel sensor, chad drawer
6085	15-3/4" panel with take-up and low tape sensor
6086	15-3/4" panel with take-up and full reel sensor (with Backspace option)
6087	15-3/4" panel with take-up and low tape sensor (with Backspace option)
6088	15-3/4" panel with take-up and full reel and low tape sensor
6089	15-3/4" panel with take-up and full reel and low tape sensor (with Backspace option)
6092	15-3/4" panel without take-up and with low tape sensor
TPS 87	Table-top mounting that includes supply reel and chad drawer



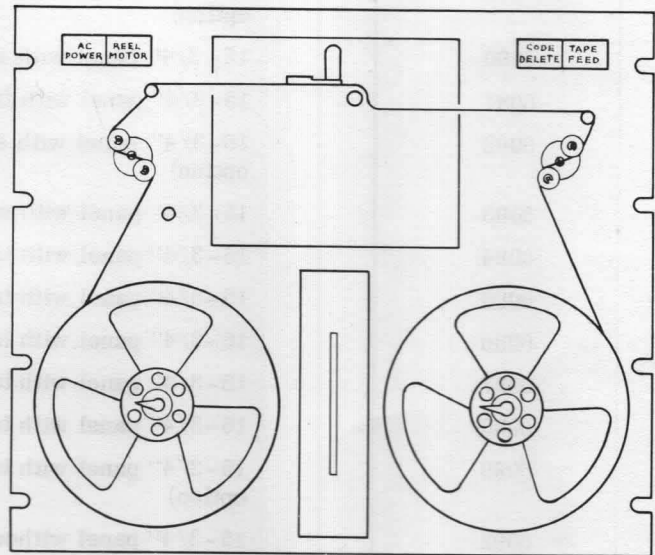
6060



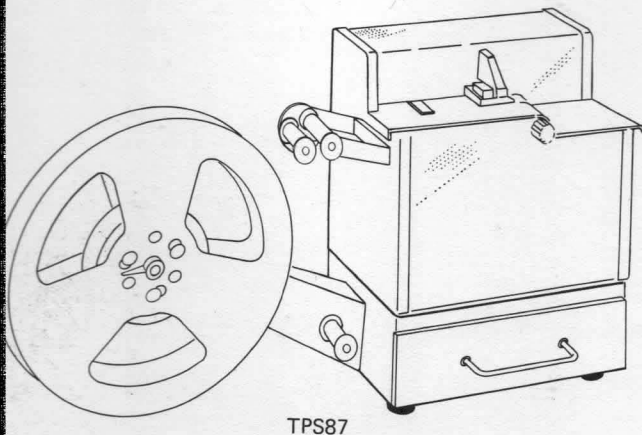
6061



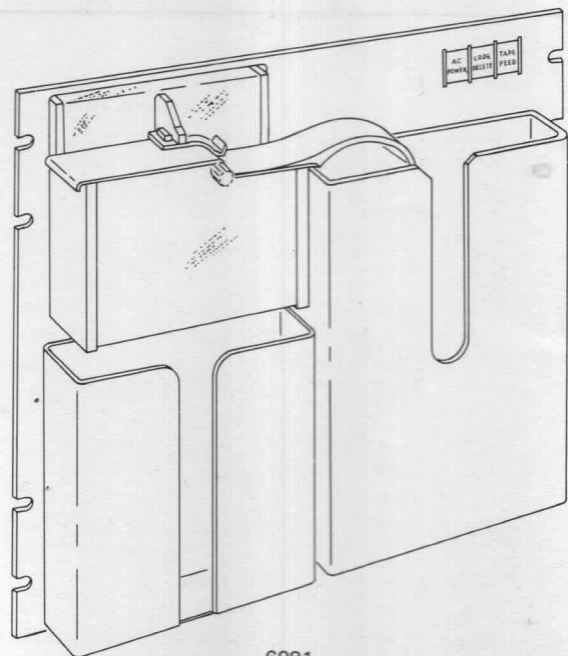
6062



6080



TPS87



6081

NOTE: Above Options Shown with P-135 Paper Tape Punch

Figure 1-4. Paper Tape Punch Package Options

SECTION II

INSTALLATION

2.1 GENERAL

This section describes the procedures for the proper installation and initial checkout of the P135 punch.

2.2 UNPACKING

The Model P135 Paper Tape Punch is shipped in a reinforced cardboard packing carton that is designed to provide maximum protection for the equipment during handling and transportation. The packing case is reusable and should be retained for possible future re-shipment of the equipment. Care should be exercised while unpacking to prevent damage to the equipment and all parts of the equipment should be checked against the packing list to ensure that the shipment is complete. A visual check should be performed to verify that the equipment did not sustain damage during transit. Should the visual inspection result in the discovery of damage or an incomplete shipment, the carrier and Digitronics Corporation should be notified immediately.

2.3 MECHANICAL INSTALLATION

The unit is secured to mounting brackets that are designed for direct installation into a panel assembly (Figure 2-1), or with a rack adapter option, the unit can be mounted into a standard 19-inch RETMA rack. Free air cooling is sufficient for ventilation of the unit when mounted in an open rack; however, when the unit is mounted in a closed cabinet along with

other heat producing equipment, forced air or other methods of cooling must be used.

2.4 ELECTRICAL INSTALLATION

The Model P135 Paper Tape Electronics Package is a self-contained unit that only requires connection to an external line voltage source. The electrical installation for the basic punch head assembly (without electrical package) consists of connecting and wiring the interface signals to the external power source. The punch interface wiring is routed through a 34-pin interface connector (Winchester, XAC34PF2006) that is supplied with a mating connector. The mating connector (Winchester, XRAC 34SJTDH) should be wired in accordance with customers requirements as illustrated in Figure 2-2.

2.5 INITIAL INSTALLATION CHECKS

Following the installation of the equipment, it is recommended that the following checks be performed to verify the proper operation of the equipment.

- a. Load tape and operate the Paper Tape Punch as described in Section III, paragraph 3.3. Inspect punched tape to verify proper punch operation.
- b. With ac power applied to tape handler (if applicable), check that tape handler functions properly while punch is operating.

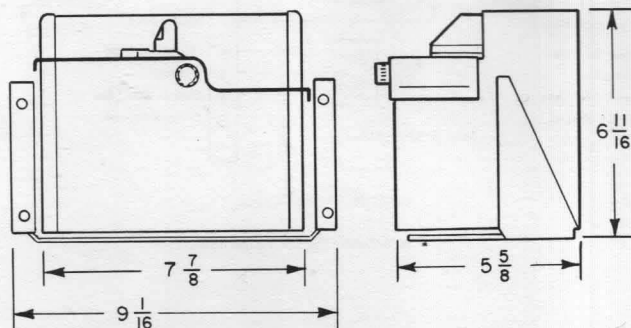


Figure 2-1. Basic Punch Outline Dimensions

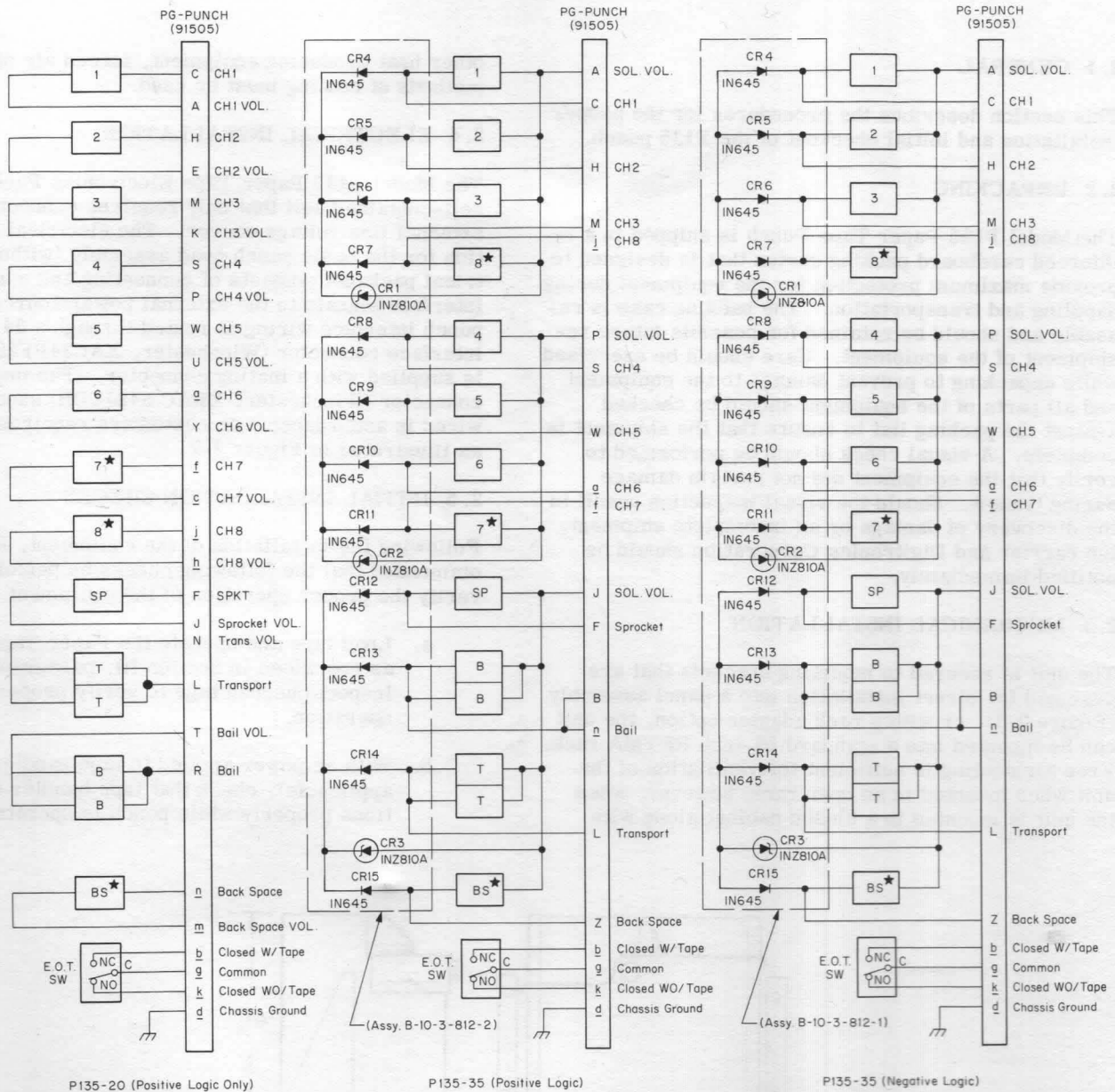


Figure 2-2 P135 Interface Diagrams

SECTION III

OPERATING PROCEDURES

3.1 GENERAL

This section describes the operating procedures for the Model P135 Paper Tape Punch. It is assumed that the unit has been properly installed in accordance with procedures outlined in Section II, Installation Procedures.

3.2 OPERATING CONTROLS

Refer to Figure 3-1 and Table 3-1 for a detailed description and illustration of the Model P135 Paper Tape controls and indicators.

3.3 OPERATING PROCEDURES

3.3.1 Loading Tape

The installation and removal of paper tape requires that the paper hold down be in the up-position to expose the tape path. To load tape, proceed as follows:

- a. With paper hold-down in the up position, insert the tape under the End-Of-Tape (EOT) sensor, through punch block, and over the drive sprocket; apply finger pressure to the tape on the drive sprocket to start initial drive sprocket holes.
- b. Close paper hold-down and advance the tape with the Manual Advance Knob.
- c. Check the adjustment of the tape guide on EOT sensor bracket to ensure that the proper tape width is slightly wider than the maximum width of the tape to be punched.
- d. The punch is now ready for operation.

3.3.2 Tape Perforation

Tape perforation is controlled by external signals. Refer to Section I, Paragraph 1.4 for a detailed description of tape drive and paper tape punch signals.



Figure 3-1 Tape Controls

Table 3-1 Operating Controls

CONTROL	FUNCTION
Paper Hold-down	Spring loaded lever; holds tape in place over sprocket wheel and engages E. O. T. sensor in the down position. Moves upward to allow for tape loading.
Manual Advance Knob	Moves sprocket wheel to allow manual advancement of tape in either forward or reverse directions.
End-of-Tape Sensor	Automatically provides end-of-tape indication through closed switch contacts.

SECTION IV

THEORY OF OPERATION

4.1 GENERAL

This section provides a detailed description and analysis of the electro-mechanical operation of the Model P135 Punch.

4.2 ANALYSIS OF TAPE PUNCH OPERATION

The basic tape punch unit is a solenoid-actuated, eight-channel tape perforator. It consists of nine tape punch mechanisms (one for each data channel plus sprocket channel) and a paper tape transport mechanism. The basic punch head does not contain either Control Electronics or a Power Supply unit therefore all drive signals must be supplied by an external source. Figure 4-1 illustrates the timing diagrams requirements for the Model P135 Punch unit when used with an external source.

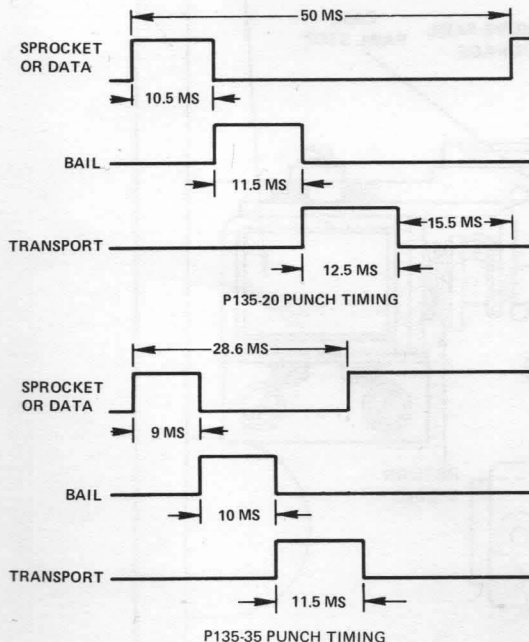


Figure 4-1. Punch Head Timing

4.2.1 Punch Mechanism

Each individual tape punch head mechanism consists of a driver solenoid, punch pin, and solenoid-to-pin linkage (Figure 4-2). Input power for the solenoid is applied via the interface connector located at the rear of the unit.

When a voltage potential is placed across the punch solenoid, current begins to flow exponentially through the solenoid because of the inductance of the solenoid coil. As the current flow through the solenoid increases, the magnetic field within the solenoid coil increases and causes the force exerted on the solenoid plunger to increase.

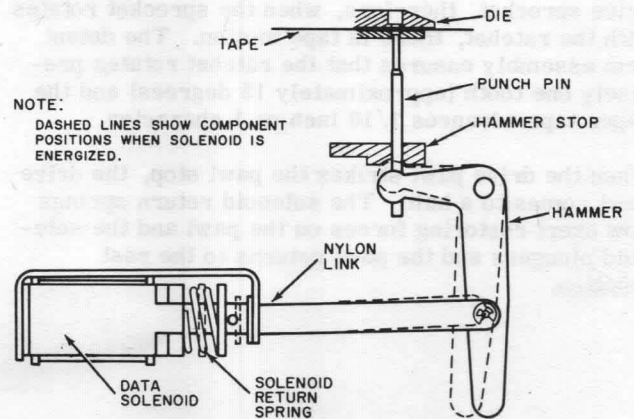


Figure 4-2. Tape Punch Mechanism

When the solenoid current nears its peak value (approximately 4 milliseconds after the leading edge of the input pulse), the magnetic force exerted on the solenoid plunger exceeds the compression force exerted by the solenoid return spring and the solenoid plunger starts to move. As the plunger moves, it pulls the DELRIN link which causes the hammer to rotate on its pivot point. As the hammer rotates it drives the punch pin upward and perforates the tape.

When the hammer strikes the hammer stop, the punch pin comes to a halt and the solenoid return spring now exerts a force on the solenoid plunger. Since no current is flowing in the solenoid at this time, only the spring force is present and the spring force causes the punch pin and its drive components to return to the rest positions.

NOTE

Although the input pulse goes off and the solenoid current begins to decay before the solenoid plunger is fully retracted, the momentum attained by the plunger is sufficient to maintain motion.

4.2.2 Transport Mechanism

The tape transport mechanism used for tape movement is of a Watt's linkage configuration. The tape transport drive linkage consists of: two drive solenoids, drive pawl and associated linkage, ratchet, and a detent arm assembly (Figure 4-3). Power for the solenoids is applied from the customers power source via the interface connector located at the rear of the paper tape punch.

When it is desired to move the tape, a 5.5-millisecond pulse is applied to the drive solenoids. Current immediately begins to flow through the solenoids; however, the solenoid inductances prevent an instantaneous rise in solenoid current and the currents increase exponentially (Figure 4-4).

The ratchet is mounted on the same shaft as the tape drive sprocket, therefore, when the sprocket rotates with the ratchet, there is tape motion. The detent arm assembly ensures that the ratchet rotates precisely one tooth (approximately 15 degrees) and the paper tape advances 1/10 inch or 1 character.

When the drive pawl strikes the pawl stop, the drive pawl comes to a halt. The solenoid return springs now exert restoring forces on the pawl and the solenoid plungers and the pawl returns to the rest position.

When the solenoid currents near their peak values, the solenoid plungers begin to move. As the plungers move, they pull the DELRIN links connected to them. The DELRIN links in turn exert a counterclockwise force on the drive pawl linkage and causes the linkage to rotate.

The drive pawl is driven against the ratchet, causing the ratchet to rotate. To prevent drive pawl overshoot, the maximum travel distance is determined by the pawl stop.

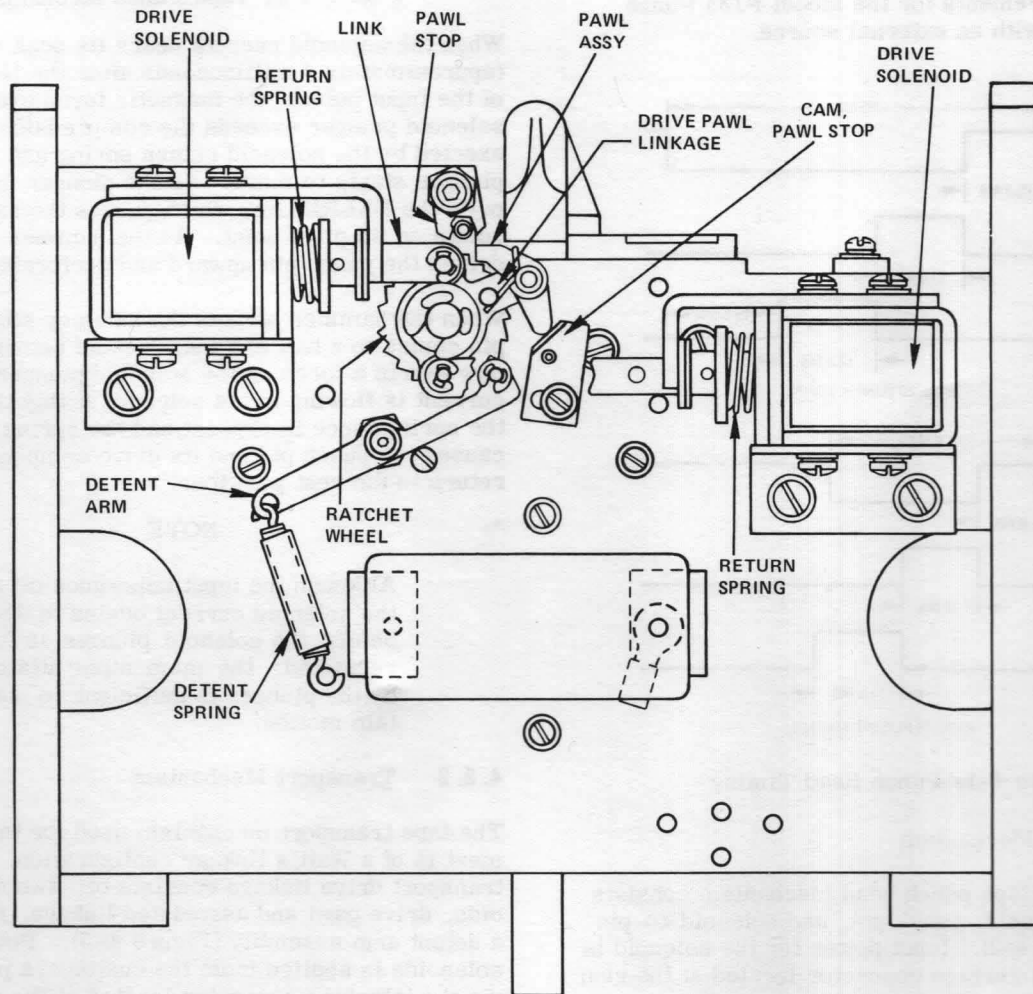


Figure 4-3. Tape Transport Mechanism

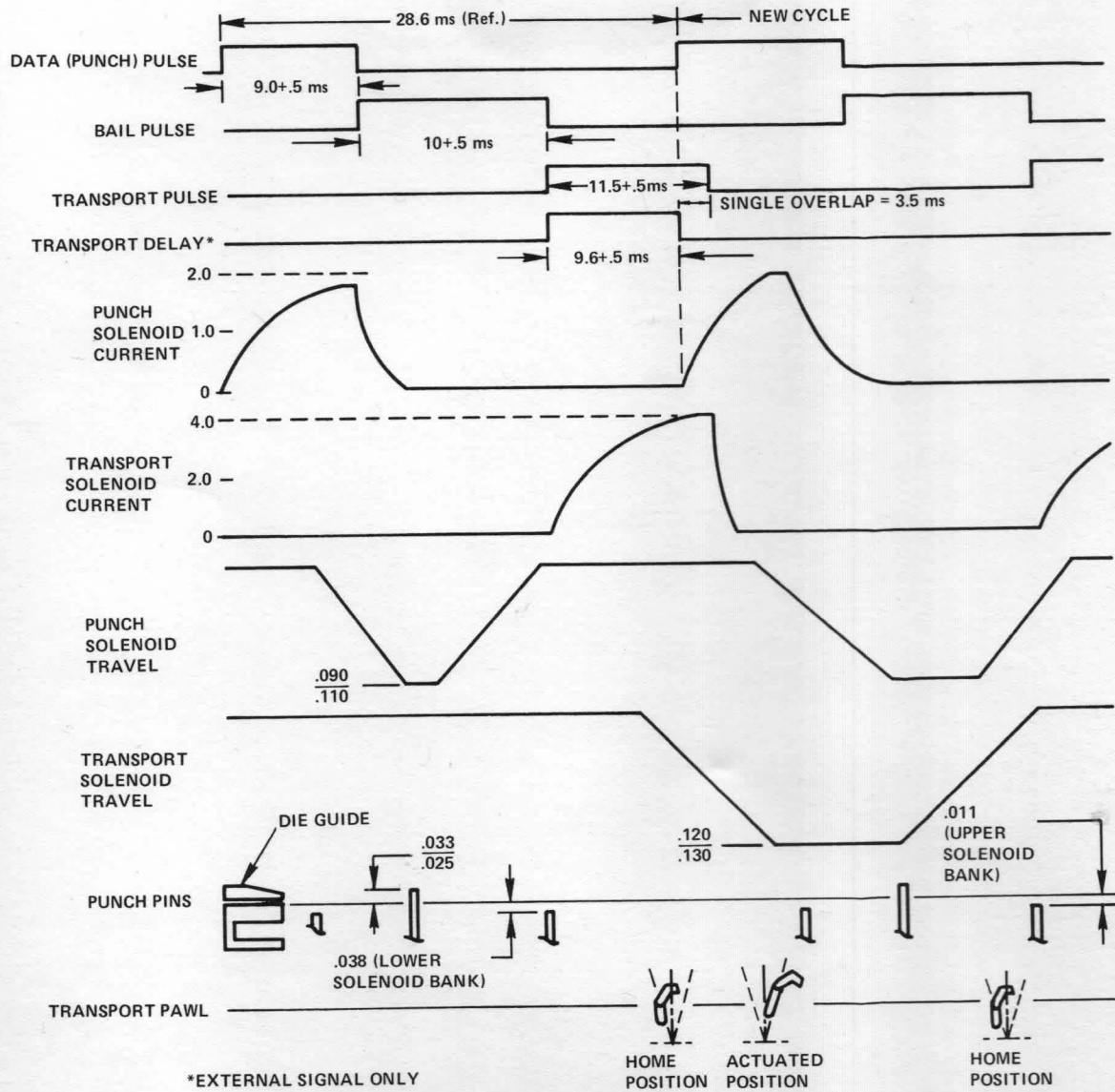


Figure 4-4 Punch Timing Diagram

SECTION V

MAINTENANCE

5.1 GENERAL

This section contains preventive maintenance, component removal procedures, and adjustments. Figure 5-1 illustrates and identifies the major components of the Model P135 Punch. The Illustrated Parts Break down (Section VI) should be used in conjunction with this section for part identification and location.

5.2 PREVENTIVE MAINTENANCE

To ensure trouble-free operation and to minimize equipment down-time, preventive maintenance should be performed at intervals of every six months or every 10 millionth operation whichever occurs first. Preventive maintenance of the Model P135 Punch consists of; inspection, cleaning, and lubrication.

5.2.1 Periodic Inspection

The equipment should be carefully inspected prior to being put into service and at periodic intervals thereafter. A complete inspection involves a visual examination of electrical wiring and mechanical details. If defects are evident during the periodic inspection, component replacement and/or adjustment procedures should be performed immediately.

5.2.2 Cleaning

The punch components in the die and guide area (Figure 5-2) should be cleaned as often as required. Clean the die and guide area with a dampened cotton swab or lint-free cloth immersed in Isoprophyl alcohol.

5.2.3 Lubrication

Refer to Figure 5-3 and lubricate the points indicated in accordance with Table 5-1.

NOTE

Use lubricants sparingly to avoid possible failure due to chad and dust collection on lubricated components.

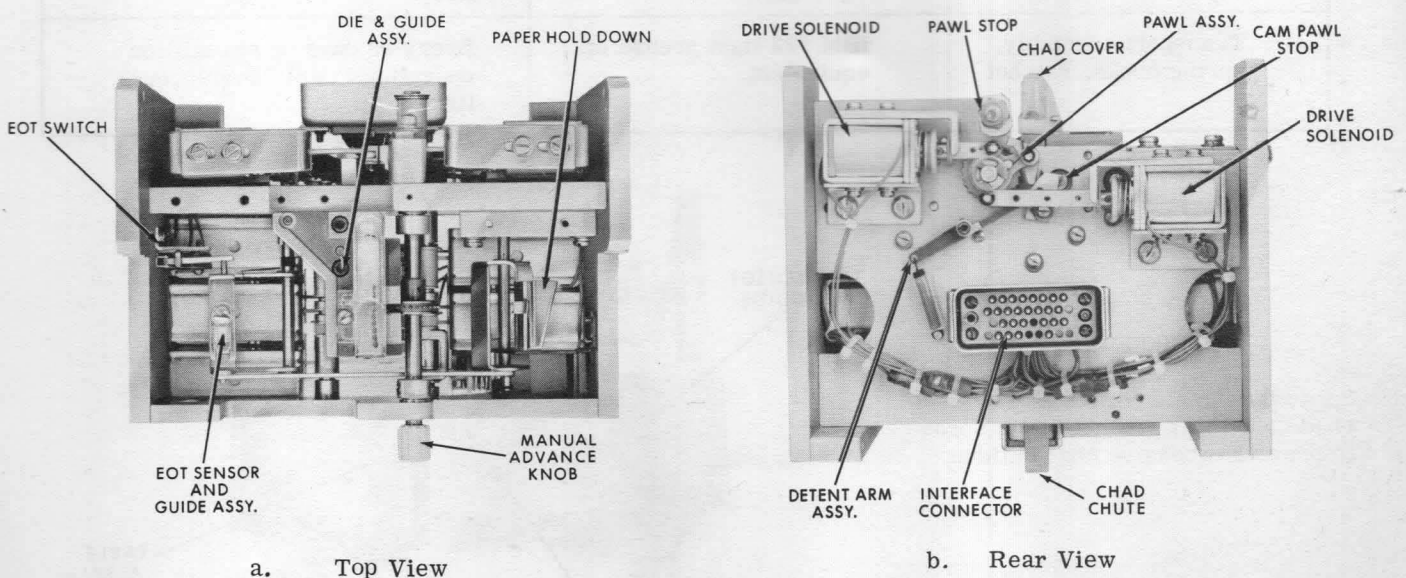


Figure 5-1. Component Locations

5.3 CORRECTIVE MAINTENANCE

When the equipment has been installed properly and preventive maintenance has been carried out, any irregularities that occur in the performance of the equipment can be attributed to the failure of some component part. The unit has been factory adjusted and therefore the adjustment procedures outlined in this section should not be undertaken until after corrective maintenance has either proven ineffective or after replacement of parts.

When it becomes necessary to trouble-shoot the equipment, locate the defective circuit or component, using conventional trouble-shooting techniques. The Trouble Isolation Guide (Table 5-2) is provided as an aid in localizing some problems. However, this table does not include all possible malfunctions or remedies for the punch unit.

5.4 COMPONENT REMOVAL AND REPLACEMENT PROCEDURES

The procedures outlined in this paragraph are to be used as an aid during the removal and replacement of components. Removal and replacement of units not outlined in this section are not listed because they require no subsequent adjustments, extraordinary precautions, or other special attention beyond normal good practice. Unless otherwise indicated, replacement procedures are the reverse of removal procedures.

5.4.1 Die and Guide Removal and Replacement Procedure

1. Remove three #4-40 screws securing left and right solenoid mounting covers and remove covers from the punch housing.
2. Turn punch upside down and remove four threaded shock mounts securing front and rear covers to unit. Lift and remove covers from unit.
3. Disconnect and remove the Interface Connector from the rear of the punch housing.

NOTE

If back space option is installed on unit it should be removed at this point.

Table 5-1. Lubrication Schedule

Component	Lubricant	Frequency
Punch hammer shaft	Fill hammer shaft with IBM #23 light grease or equivalent.	Every 6 months or ten million operations, whichever occurs first.
Transport assembly, spring hooks, ratchet	IBM #23 light grease or equivalent.	Every 90 days or ten million operations, whichever occurs first.

NOTE

Spray the interior of the plastic chad cover with an anti-static spray to prevent excessive chad buildup.

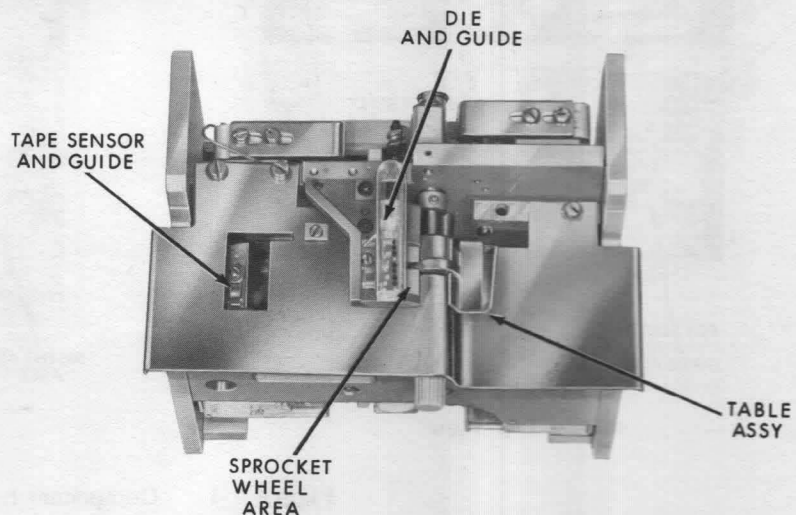


Figure 5-2 Areas To Be Cleaned

4. Turn punch upside down and remove four #4-40 screws securing front and rear covers to unit. Lift and remove covers from unit.
5. Loosen #6-32 allen head set screw securing the manual advance knob and remove knob from the unit.

Remove two #6-32 screws securing the bail bracket assembly to the back mounting plate and carefully remove the bail solenoids and solenoid springs from the punch (Figure 5-4).
6. Remove the four #8-32 screws securing the Table assembly and the Paper Guide assembly covers from the unit.
7. Remove the two #4-40 screws securing the paper holddown assembly to the right hand side plate. Do Not Remove Holddown Assembly.
8. Disconnect and remove the spring securing the paper holddown and paper guide linkage from the unit.
9. Remove the #6-32 screw securing the Chad cover and remove the cover from die and guide assembly.
10. Remove the two #4-40 screws securing the right and left hand hammer shaft assemblies to the front plate.
11. Remove the two #4-40 screws securing the R and L hammer shaft assemblies to the front plate.
12. Carefully remove front plate from the punch, pull the plate straight out so that the bearing in the Advance Knob shaft hole is not damaged.
13. Install the two #4-40 screws removed in step 11 into the hammer shaft assemblies to prevent the hammer shaft bearings from falling off when the "E" washers are removed from the hammer links.
14. Remove the nine "E" retaining rings securing the DELRIN links to the hammer linkage arms.
15. Carefully lift and disengage all the DELRIN links from the hammer linkage arms.
16. Remove the two #8-32 screws securing the right and left hand side mounting plates to the rear plate assembly.

Table 5-2. Trouble Isolation Guide

Symptom	Probable Cause	Remedy
Run pulse applied but tape does not advance.	Defective driver circuit.	Check circuits and repair as required.
	Defective transport solenoid.	Replace solenoid and adjust.
Does not track tape properly.	Tape guide out of adjustment.	Adjust tape guide for proper tape width.
Distorting or tearing tape drive sprocket holes.	Improper pitch adjustment.	Adjust pitch.
	Excessive tape handler supply reel drag.	Check tape handler and repair as required.
Solenoids operate but sprocket does not rotate.	Improper feed pawl to ratchet clearance.	Adjust feed pawl to ratchet clearance.
Dropping data bits intermittently.	Excessive chad build up.	Clean chad chute.
	Defective data solenoid.	Replace solenoid.
Data and sprocket hole spacing incorrect.	Improper pitch adjustment.	Adjust pitch.

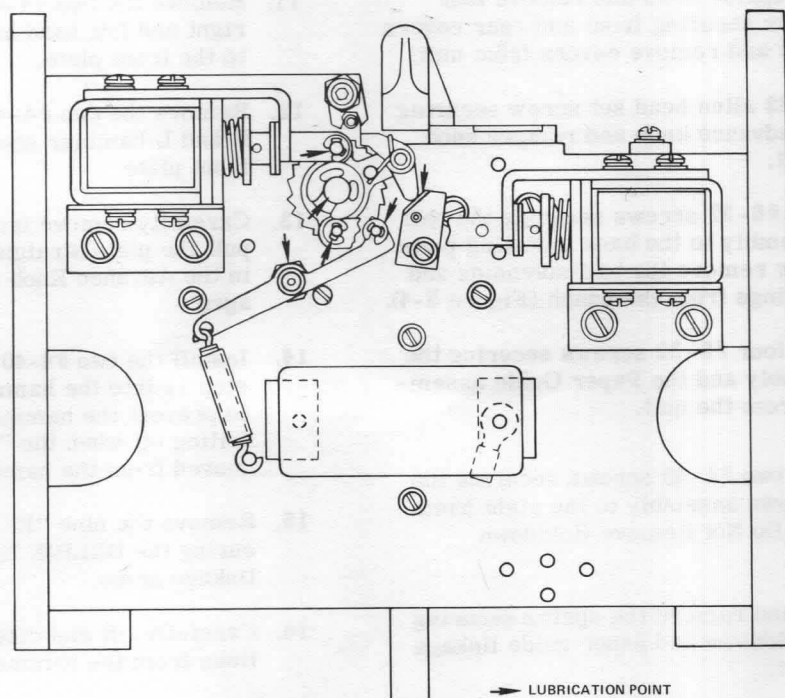


Figure 5-3 Lubrication Points

NOTE

If arc suppression option is installed, there will be an additional two #8-32 screws from each side that will be removed.

18. Gently remove the side mounting plate (with solenoid and linkage still intact) from the unit.
19. Gently push hammers aside (left and right) and remove the bail assembly from the punch. Note position of beveled edge of the bail bracket with respect to punch unit for later reference.
20. Hammer replacement (if necessary) can now be accomplished.
21. Remove the data punch pins and the sprocket punch pin from the die and guide assembly.
22. Carefully position the punch so that the two #8-32 screws securing the die and guide can be seen from the rear of the punch.
23. Remove the "E" ring from the right transport link.
24. Remove link from the braised arm stud.
25. Remove the two #8-32 screws securing the right transport assembly and remove solenoid.
26. Remove screw #4-40 securing the pawl stop cam assembly and remove the pawl stop.
27. Remove the two #8-32 screws securing the die and guide assembly to the rear plate. (Note length of screws).
28. Remove die and guide (Strike dowel pin with hammer and drift pin, if necessary).
29. Remove the two #4-40 flat-head screws securing the nylon hammer buffer from the removed die and guide and reinstall on the new die and guide. Make sure hole clearance for the punch pins are not covered when installing the nylon cover.

The sprocket pin is located in the fourth position from the rear plate and is the thinnest of all the pins removed.

CAUTION

Replace pins in order of removal to prevent damage to die and guide assembly.

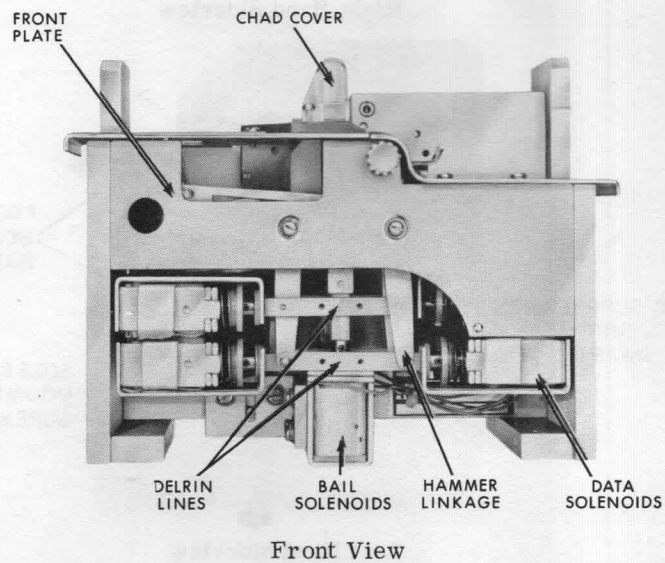
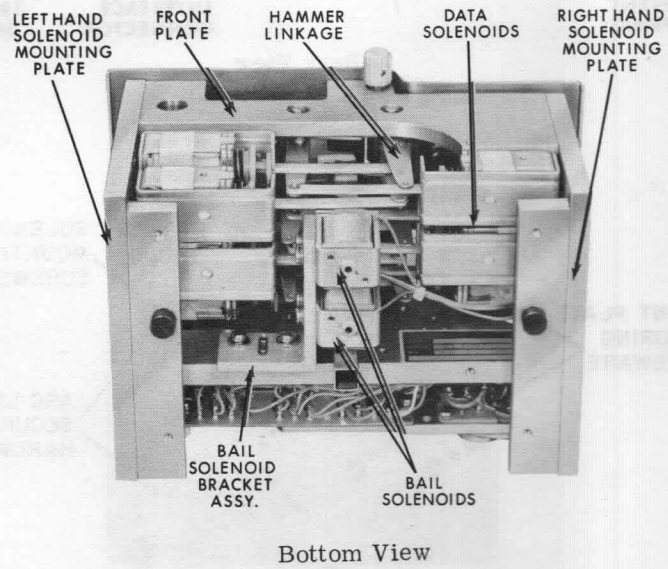
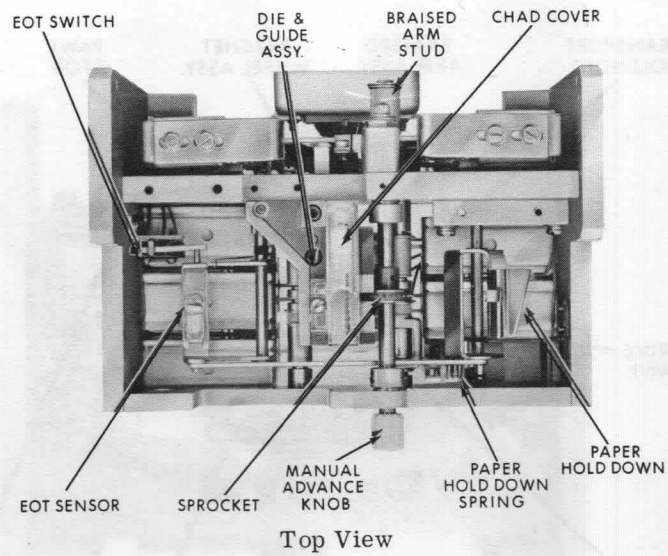
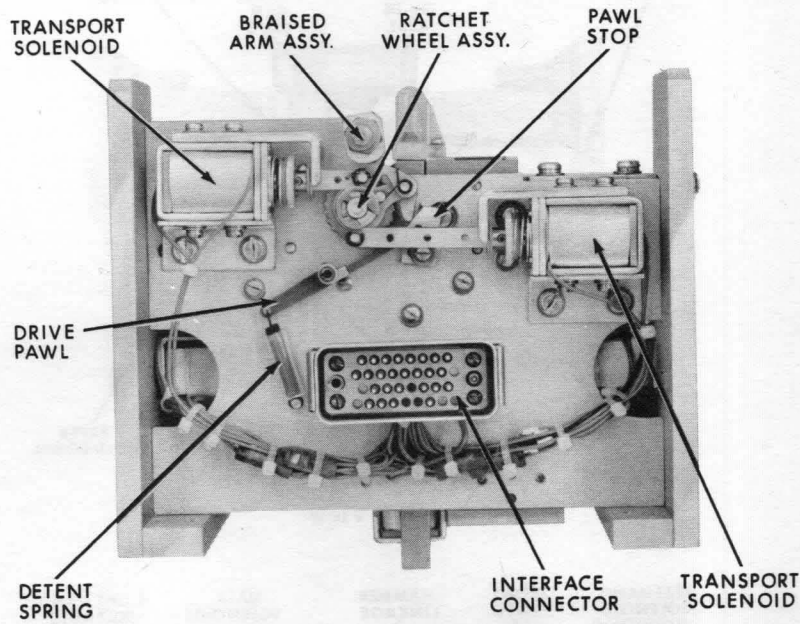
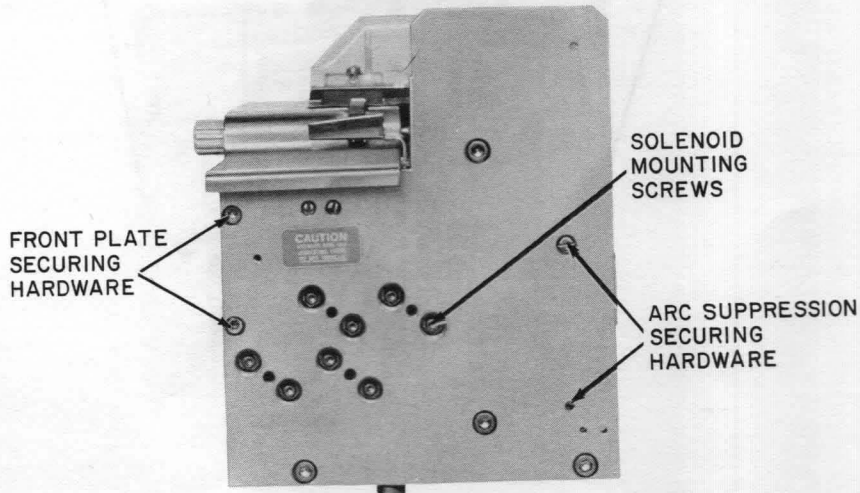


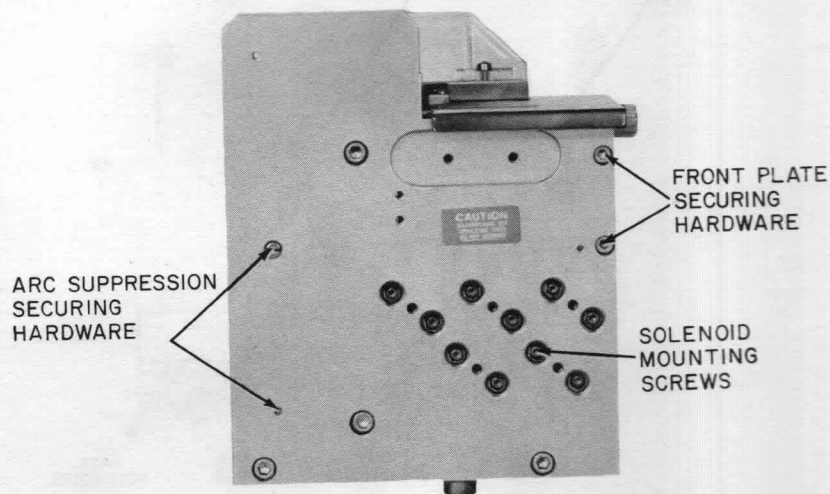
Figure 5-4 Die and Guide Removal (Sht 1 of 2)



Rear View



Right Hand Sideview



Left Hand Sideview

Figure 5-4 Die and Guide Removal (Sht 2 of 2)

NOTE

Prior to installing the new die and guide, take a punch pin previously removed and check the new die and guide for freedom of movement and to ensure that it is free of burrs or obstructions.

30. Place die and guide into position and attach to rear plate with previously removed #8-32 screws.
31. Replace the pawl stop cam with the previously removed hardware.
32. Replace the transport solenoid and secure with the previously removed hardware.
33. Attach solenoid line and "E" ring to stud on the braised arm assembly.
34. Carefully turn unit over for access to the front cover plate.
35. Install punch pins (install gently so that pins are not damaged) in the same order as removed.
36. Install bail assembly with beveled edge facing upward.
37. Lift the punch pin closest to the beveled edge on the bail assembly and insert the hammer link on the flat surface of the punch pin. Carefully work the punch pin and hammer link until the punch pin falls into the die and guide assembly. Do not release the hammer link!

NOTE

Punch pins and hammer linkage can be secured by placing a rubber band around the bail bracelet and each hammer link as they are seated.

38. Perform step 9 for remaining punch pins.
39. Carefully install right hand mounting plate. Ensure the EOT switch is not damaged during installation and attach the side plate with previously removed #6-32 screws.
40. Connect solenoid links to the correct hammer link and secure with "E" rings.
41. Ensure the EOT switch arm is positioned under the small bar that protrudes from the side of the paper holddown lever.
42. Install the left hand side mounting plate and secure with the two #6-32 screws previously removed. Make sure bail solenoid wires are routed through the cutout hole in the rear mounting plate before attaching side mounting plate.

43. Connect remaining solenoid links and attach with "E" rings to hammer links.

NOTE

Make sure link movement is not obstructed or binding.

44. Position the bail solenoids and solenoid springs into place and secure the solenoids with the previously removed hardware.
45. Perform Bail Adjustment (Refer to Paragraph 5.5.7).
46. Attach the paper holddown bracket to the right side mounting plate with previously removed hardware.
47. Remove the two #4-40 screws securing the hammer shafts and position the front mounting plate into position and secure with previously removed hardware.
48. Secure the hammer shaft screws through the front mounting plate with the two #4-40 screws removed in step 19.
49. Attach the paper holddown spring to the paper holddown linkage.
50. Install table and paper guide assembly to unit.
51. Install and secure Chad cover.
52. Perform Transport Adjustments.

5.4.2 Transport Solenoid Removal Procedure

1. Disconnect and remove the Interface Connector from the rear of the punch housing.
2. Remove three #4-40 screws securing left and right solenoid mounting covers and remove covers from the punch housing (Figure 5-4).
3. Turn punch upside down and remove four #4-40 screws securing front and rear covers to unit. Lift and remove covers from unit.
4. Remove the "E" ring from the transport link being removed.
5. Remove link from the braised arm stud.
6. Remove the two #8-32 screws securing the left transport assembly and remove solenoid.
7. After solenoid replacement, perform the Feed Pawl to Ratchet Clearance Adjustment (Refer to Paragraph 5.5.2).

5.4.3 Punch Solenoids

1. Disconnect and remove the Interface Connector from the rear of the punch housing.
2. Remove three 34-40 screws securing left and right solenoid mounting covers and remove cover from the punch housing.
3. Turn punch upside down and remove four #4-40 screws securing front and rear covers to unit. Lift and remove covers from unit.
4. Remove two #6-32 screws securing the bail bracket assembly to the back mounting plate and carefully remove the bail solenoids and solenoid springs from the punch.
5. Remove the necessary "E" rings securing the DELRIN links to the hammer linkage arms.
6. Carefully lift and disengage the DELRIN links from the hammer linkage arms.
7. Remove the two outer screws securing the solenoid to the mounting plate assembly and remove the solenoid

NOTE

Refer to Figure 5-5 and remove only the solenoids and linkage "E" rings necessary for easy access to damaged or bad solenoid that is to be replaced.

8. Perform Solenoid Adjustment Paragraph 5.5.5.

5.4.4 Front Plate

1. Perform steps 1 through 13 of paragraph 5.4.1.
2. After reassembly, check the punch Adjustments (Refer to Paragraph 5.5.5).

5.4.5 Hammer Removal Procedure

1. Perform steps 1 through 19 of paragraph 5.4.1.

CAUTION

Insure spacers are not lost when removing hammers. Also insure that the .005 to .008 play is maintained when the hammers are put back on their respective shafts.

2. After reassembly, check the punch Adjustments (Refer to Paragraph 5.5.5).

5.4.6 Sprocket Removal Procedure

1. Perform steps 1 through 13 of paragraph 5.4.1.
2. Remove collar from the sprocket shaft.
3. Remove sprocket roll pin, loosen setscrew and slip sprocket off shaft.
4. After reassembly, check the Pitch Adjustment (Refer to Paragraph 5.5.6).

5.4.7 Paper Holddown Removal Procedure

1. Perform steps 1 through 13 of paragraph 5.4.1.
2. Remove the hardware securing the paper holddown to end-of-tape (EOT) sensor bracket link by removing "E" rings at both ends.
3. Slip off paper holddown shaft and remove from the punch.

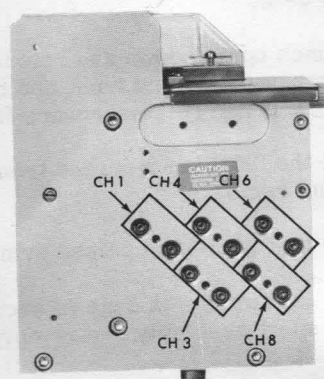
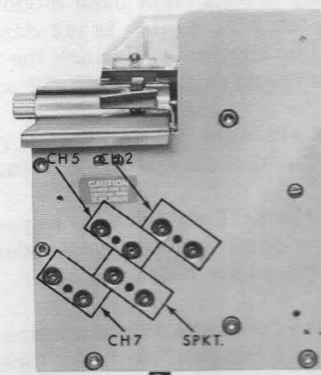
(A)
LEFT
SIDE(B)
RIGHT
SIDE

Figure 5-5 Punch Solenoid Location Guide

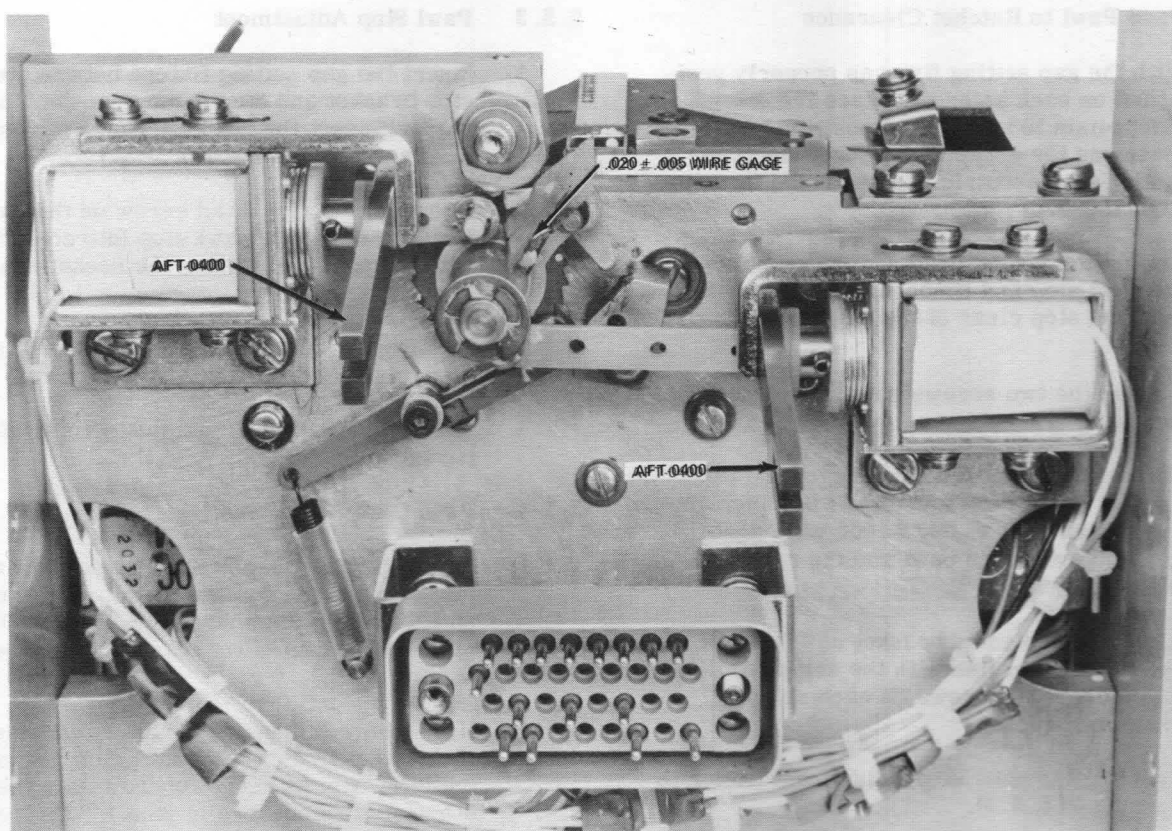


Figure 5-6 Transport Solenoid Adjustment

5.4.8 End-Of-Tape Sensor and Tape Guide

1. Perform steps 1 through 13 of Paragraph 5.4.1.
2. Remove paper holddown to end-of-Tape (EOT) sensor bracket link by removing "E" rings at both ends.
3. After reassembly, check E.O.T. switch adjustment (Refer to Paragraph 5.5.8).

5.4.9 End-Of-Tape Switch

1. Perform steps 1 through 7 of paragraph 5.4.1.
2. Remove two mounting screws and hardware securing the switch to the rear mounting plate.
3. Disconnect wires and remove switch from the rear plate.
4. Install the E.O.T. switch and perform necessary adjustment (Refer to Paragraph 5.5.8).

5.5 MECHANICAL ADJUSTMENT PROCEDURES

The following adjustment procedures are to be performed only after inspection or corrective maintenance has proven that a component is improperly adjusted or after the replacement of parts.

5.5.1 Transport Solenoids Removal Procedure

1. Loosen the two mounting screws on each transport solenoid stop bracket (Figure 5-4).
2. Insert gap setting fixture Part No. AFT-0400 (Figure 5-6) between stop bracket and plunger Buffer on each transport solenoid and compress the solenoid return spring. Slide the stop bracket back against fixture and tighten transport stop mounting screws. Repeat procedure for remaining transport solenoid.
3. Check that the links are centered on both transport solenoids and that they do not bind on the stop brackets.

5.2 Feed Pawl to Ratchet Clearance

1. With the gap setting fixtures properly positioned on each solenoid, place the detent mechanism to the neutral position by loosening the socket head screw and adjusting the eccentric as illustrated in Figure 5-7.
2. Loosen the socket head cap screw holding the pawl stop and its eccentric and move the pawl stop clear of the pawl assembly.
3. Loosen the two screws on each solenoid mounting bracket.
4. Slide each solenoid assembly toward the ratchet wheel until a $0.020 \pm .005$ inch gap (measured with a $.020 \pm .005$ wire gage exists between the pawl and the ratchet wheel.
5. Align each solenoid bracket so that each nylon link is in line with the solenoid; then tighten the two screws on each solenoid mounting bracket.
6. Perform the pawl stop Adjustment (Refer to Paragraph 5.5.3).

5.5.3 Pawl Stop Adjustment

1. Insert the gap setting fixture between the stop bracket and stop damper on each solenoid and insert the .020 tolerance pin as illustrated in Figure 5-7.
2. Loosen the socket head screw on the pawl stop and bring the pawl stop into contact with the pawl and tighten the socket head screw.
3. Remove gap setting fixtures and .020 tolerance pin from punch assembly.
4. Perform the Pawl Cam adjustment (Refer to paragraph 5.5.4).

5.5.4 Pawl Cam Adjustment

1. Rotate the pawl counterclockwise until it just engages the ratchet wheel. The pawl should engage anywhere from 25% to 50% from the bottom of the ratchet wheel tooth (Figure 5-8).
2. If the above dimension cannot be obtained, loosen the screw on the pawl cam and rotate the pawl cam as necessary to obtain the dimension referenced in step 1. Tighten the pawl cam screw.

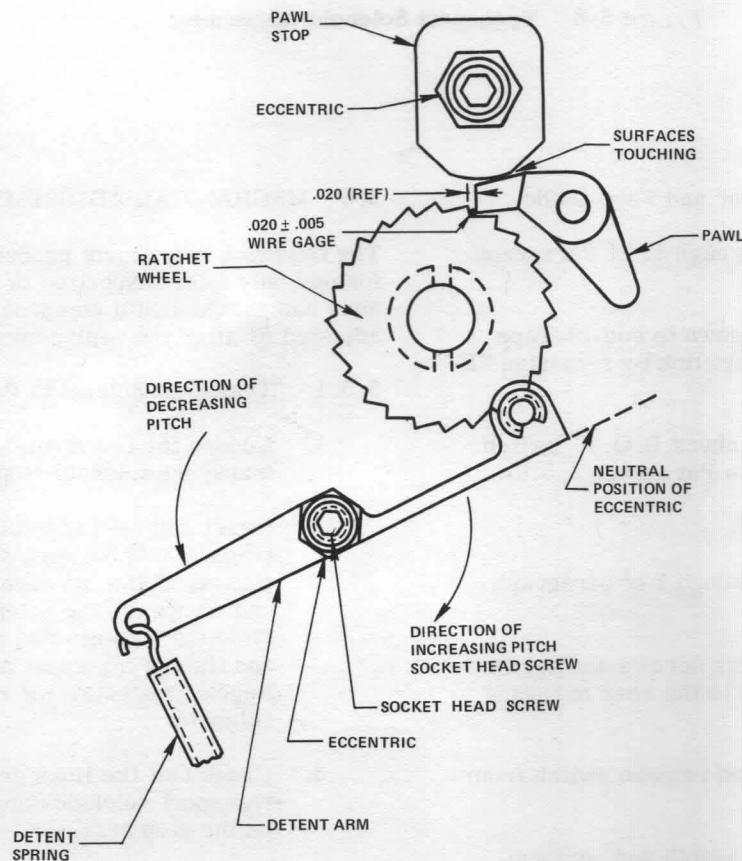


Figure 5-7 Detent Adjustment

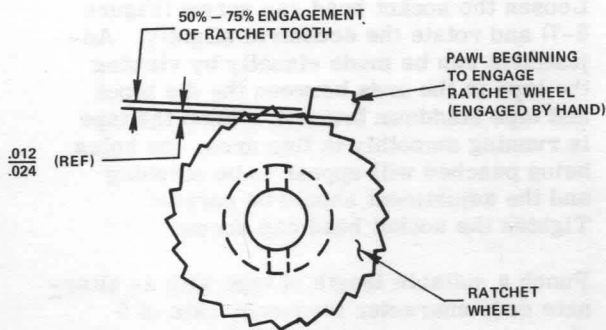


Figure 5-8 Pawl Cam Adjustment

3. Release the pawl and allow the pawl to rest on the pawl cam.
4. Rotate the ratchet wheel and assure that a minimum clearance of 0.005 inch is obtained between the pawl and all teeth on the ratchet wheel (Figure 5-9). Readjust the pawl cam as necessary to obtain this clearance and repeat steps 1 through 4 until the dimensions referenced in Figures 5-8 and 5-9 are within tolerance.
5. Perform the detent adjustment (Refer to Paragraph 5.5.6 steps 1 through 5).

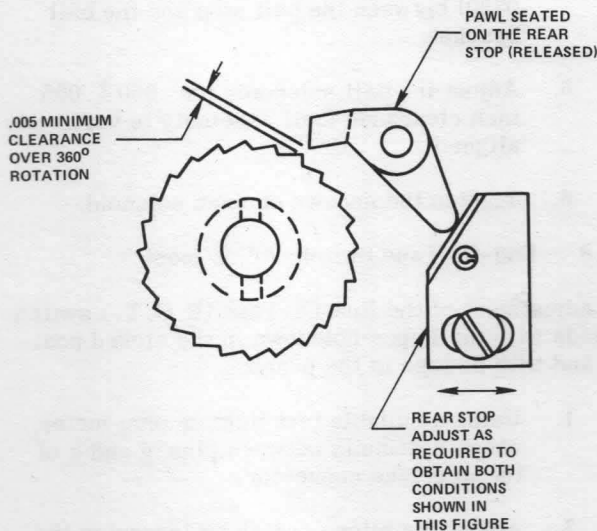


Figure 5-9 Radial Clearance Adjustment

5.5.5 Punch Solenoid Adjustment

The basic adjustment of the data and sprocket holes encompasses three distinct points of reference; (a) the punch die and guide assembly, (b) the hammer assembly and, (c) the data and sprocket punch solenoids.

Each punch solenoid is attached by two inner and two outer socket head screw combinations. This adjustment is used to vary the punch pin penetration. When properly adjusted, punch pin penetration is approximately 0.027 inch into the die (Figure 5-10).

NOTE

Punch pin penetration dimension is for reference only. It is to be used as a starting measurement when mechanical parts for the punch solenoid are changed.

1. Remove the hardware securing the chad cover from top of the die block.
2. Loosen (do not remove) two inner socket head mounting screws on solenoid to be adjusted.
3. The solenoid is adjusted by turning the two outer socket head mounting screws. Turning the outer socket head screws clockwise moves the solenoid away from the mounting plate, decreasing the amount of punch pin penetration. Counterclockwise rotation of the outer socket head screws moves the solenoid toward the mounting plate, increasing the amount of punch pin penetration. Adjust for punch pin penetration of 0.027 ± 0.005 inch.

NOTE

To maintain perpendicularity between solenoid and mounting plate, turn both outer mounting screws an equal amount or as close as possible during adjustments.

4. Tighten the two inner socket head screws and recheck alignment.
5. Manually actuate solenoid being adjusted.

NOTE

When properly aligned and adjusted, there should be no visible strain on DELRIN links when in the manually actuated condition. The solenoid should be fully actuated just before the hammer contacts the nylon stop and thereby relieve the strain on the nylon links.

6. Install the chad cover on top of die block with the previously removed hardware.

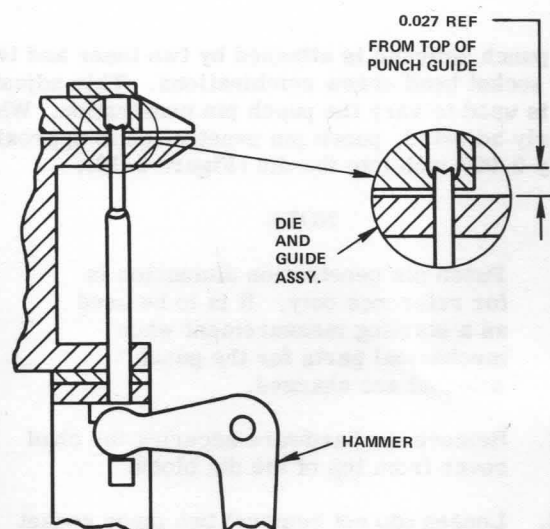


Figure 5-10 Punch Pin Penetration

5.5.6 Pitch Adjustment and Pull Test

The pitch adjustment controls the stepping distance from one character to another. The stepping distance is adjusted to 0.10 inch with an accumulated tolerance of $\pm .009$ inch within spans of 0.9 to 6 inches (per EIA standard RS-227, October 1971). Measurement of stepping distance is made in reference to the data hole spacing by using a SOROBAN MASTER TAPE GAGE (Soroban No. C-7284).

[Reference Mil Standard No. 188B]

1. Load the P135 Punch with $0.004 \pm .0003$ inch oiled paper tape.
2. Punch a suitable length of tape using an alternate code character frequency rate of 5 characters per second.
3. Check the tape on the Soroban tape registration gage and check the punched holes for proper registration.
4. If the registration in step 3 is not correct, Detent Adjustment is required.
5. Loosen the socket head cap screw and rotate the hex head on the eccentric cam (Figure 5-7). To increase the pitch, rotate the eccentric clockwise. To decrease the pitch, rotate the eccentric counterclockwise. (Ensure socket head cap screw is tightened prior to running the punch).
6. Repeat steps 2 through 5 until registration is correct.
7. Operate the punch at the rated speed (20 or 35 characters per second) and punch a suitable length of tape and recheck registration.
8. If registration is not correct, the pawl stop must now be adjusted.

9. Loosen the socket head cap screw (Figure 5-7) and rotate the eccentric slightly. Adjustment can be made visually by viewing the tape in the area between the die block and tape holddown bracket. When the tape is running smoothly in this area, the holes being punched will appear to be strobing and the adjustment should be correct. Tighten the socket head cap screw.
10. Punch a suitable length of tape with an alternate code character frequency rate of 5 characters per second. Check registration for accuracy. If necessary, repeat step 9 until proper registration is achieved.
11. Attach spring gage for testing Punch Pull Test (Digitronics Drawing No. ASK077) and check that the P135-35 punch pulls ten ounces (minimum) of tension before stopping.

5.5.7 Bail Solenoid Adjustment

1. Remove the Table and Paper Guide Assemblies from the punch.
2. Loosen the two mounting screws on each bail solenoid (Figure 5-11).
3. Manually pull the bail assembly away from the die and guide assembly.
4. Insert the Bail Gap setting gage (P/N FT-0720) between the bail stop and the bail bracket.
5. Adjust the bail solenoids for $.050 \pm .005$ inch clearance (bail assembly is vertically aligned).
6. Tighten the screws on each solenoid.

5.5.8 End-Of-Tape Switch Adjustment

The adjustment of the End-Of-Tape (E.O.T.) switch is made with the Paper holddown in the closed position and with no tape in the punch.

1. Using a suitable test light or ohm meter, check continuity between pins g and k of the interface connector.
2. Adjust the micro switch by loosening the mounting screws and moving the switch incrementally until continuity exists.
3. Tighten mounting screws and recheck continuity.
4. Check continuity between pins b and g of the interface connector, with tape in the unit, and the paper holddown closed.

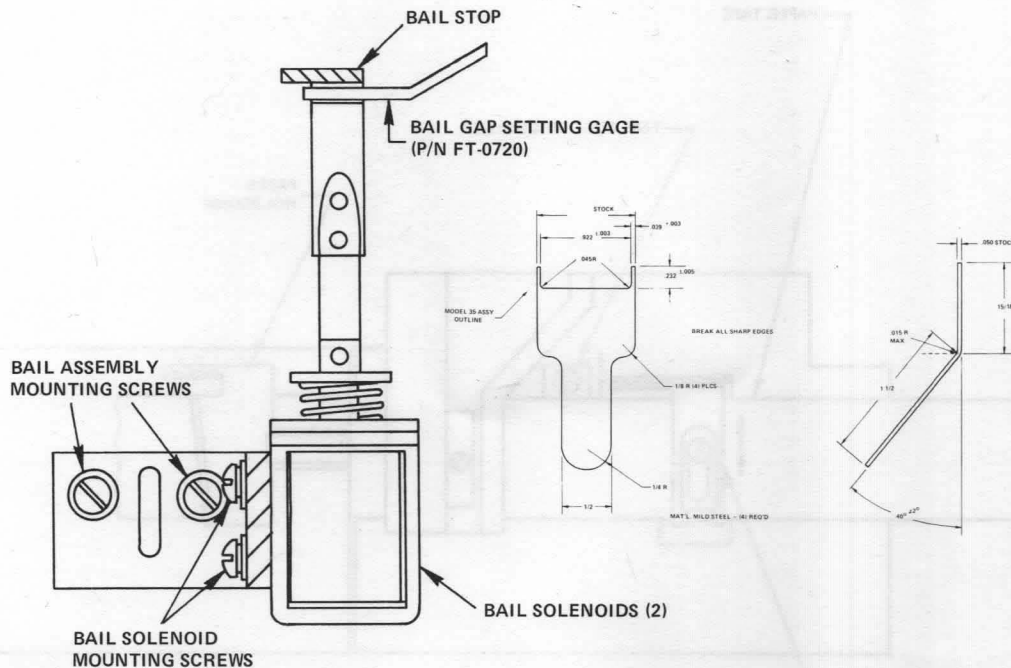


Figure 5-11 Bail Solenoid Adjustment

5.5.9 Tape Edge Guide Adjustment

The tape edge guide prevents the tape from wandering towards the rear of the unit before entering the Die and Guide Assembly.

1. Insert a piece of prepunched paper tape in the Punch unit and close the paper hold-down (Figure 5-12).
2. Loosen (do not remove) the edge guide mounting screw.
3. Visually align the edge guide so that it is parallel to, and flush with the edge of the tape. Tighten mounting screw.

5.5.10 Tape Adjustment

The P135 Punch is factory adjusted to accommodate an eight-level (one-inch wide) tape. If a narrower tape is to be used, the rear end-of-tape sensor bracket-guide combination must be adjusted (Figure 5-12).

1. Loosen rear guide clamp screw until the clamp slides freely.
2. Gently push the tape in toward the body of the punch until the tape rests against the guide edge of the die.
3. With the tape in position, adjust the guide clamp until it is touching tape. Tighten rear guide clamp screw.

5.5.11 Backspace Adjustment (Optional)

1. Loosen setscrew on backspace gear and rotate gear until a tooth on the backspace gear is vertical (Figure 5-13). Tighten setscrew.
2. Loosen the two solenoid mounting screws and move solenoid until the pawl clears the gear radially by 0.005 to 0.015 inch. Tighten the two solenoid mounting screws.
3. Loosen the socket head screw on the pawl eccentric and adjust the pawl eccentric until the pawl, when actuated by hand, indexes the gear one tooth. Tighten the socket head screw.
4. Apply a small amount of Mobil No. 16 light grease or equivalent to the backspace gear and pawl pivot.
5. Check backspace operation. The P135 Punch should backspace 6 inches of reel prepunched tape without any problems.

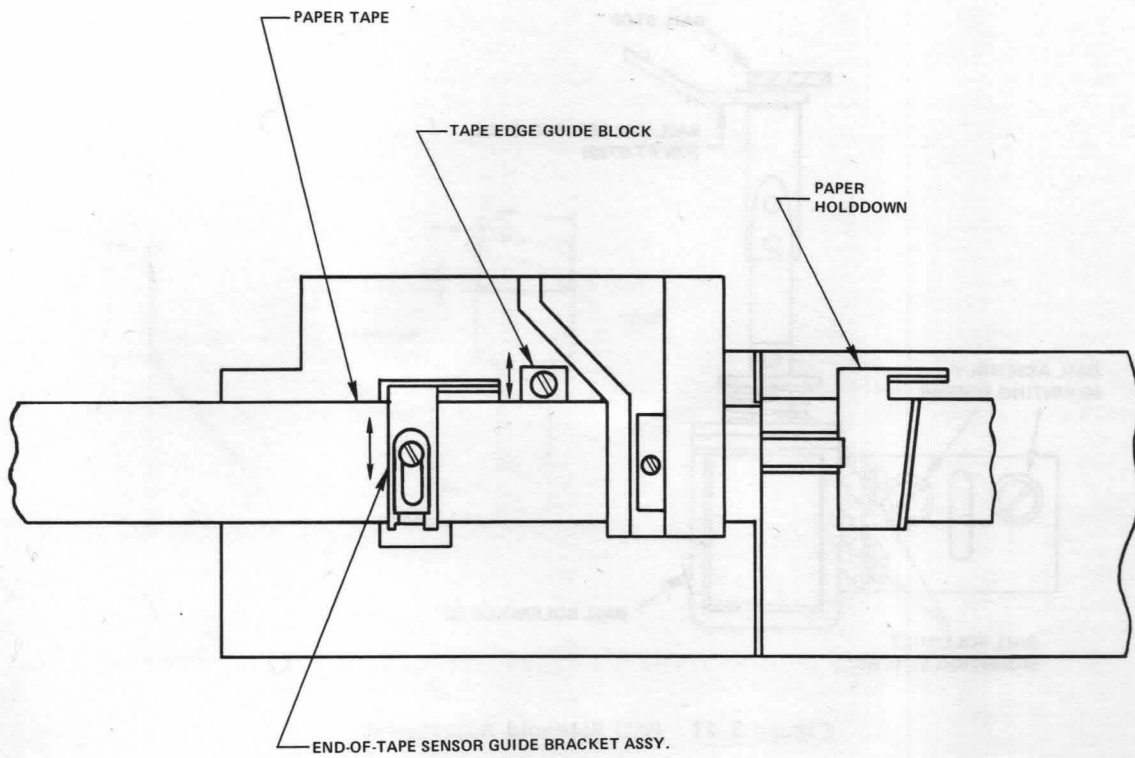


Figure 5-12 Edge Guide Adjustment

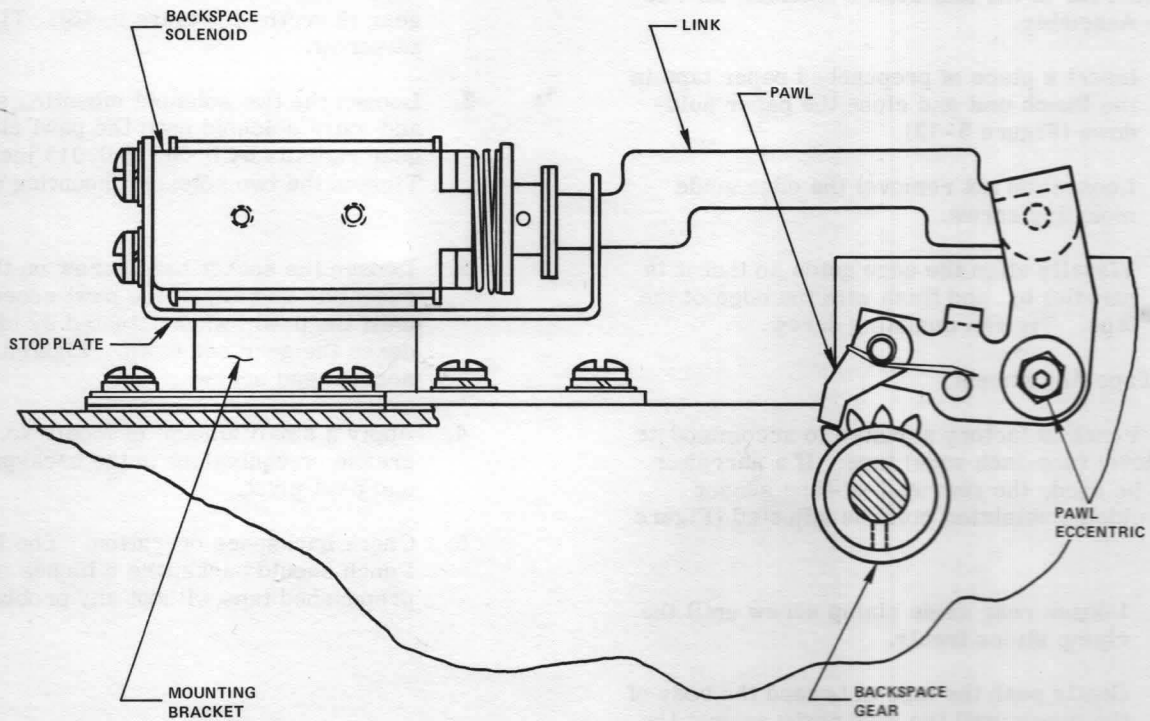


Figure 5-13 Backspace Adjustment

SECTION VI

ILLUSTRATED PARTS BREAKDOWN

6.1 GENERAL

This section lists and illustrates the component parts of the Model P135-20/P135-35 Tape Punch. A system of indention is used throughout the parts list to show the relationship between the detailed parts and the subassemblies, and between the subassemblies and the main assemblies. The parts list is presented in a tabular form containing the information given in the following paragraphs.

6.2 FIGURE AND INDEX NUMBER

The figure and index number column provides a cross reference between each list and its associated illustration. The figure number to which the parts list is keyed is followed by a dash and appears at the beginning of the listing and at the first line of continuing pages. The index numbers are preceded by a dash and correspond to those numbers on the associated illustration.

6.3 PART NUMBER

The part number column provides the Digitronics part number for each part.

6.4 DESCRIPTION

The description column lists the name and the descriptive information for each part and component listed. All components are listed in order of disassembly with the exception of the attaching parts. They are preceded by a legend "ATTACHING PARTS". The symbol "---*---" denotes end of the attaching parts.

6.5 UNITS PER ASSEMBLY

The units per assembly column indicates the quantity of the part required for the assembly or subassembly in which that part appears. "A/R" indicates as required.

6.6 USABLE ON CODE

An alphabetical code of capital letters is used in this column to indicate the interchangeability of parts for similar assemblies. The usable on codes are defined at the beginning of each applicable list. When the column is left blank, the part is used on all assemblies.

6.7 ALTERNATE PARTS

When another manufacturer's part may be substituted for a Digitronics part, the code symbol for that manufacturer and the part number appears in parenthesis as the last item in the description of the part. The following is a list of manufacturers and their codes as used in the parts list.

List of Manufacturers

<u>Code</u>	<u>Manufacturer</u>
90102	Thomas and Betts Co. Elizabeth, N. J.
90134	Winchester Electronics Inc. Norwalk, Conn.
90261	L. F. Tracy Co. Cambridge, Mass.
90408	H. M. Harper Co. Morton Grove, Illinois
91002	Minneapolis-Honeywell Boston, Mass.
91008	Minneapolis-Honeywell Boston, Mass.
91305	Hoffman Semiconductor W. Newton, Mass.
91308	Cramer Electric Newton, Mass.
91505	Winchester Electronics Inc. Norwalk, Conn.
92400	Green Rubber Co.
92405	Cord Manufacturing Co. Erie, Pa.
92700	Motorola Semiconductor Products Inc. Phoenix, Arizona

FIG & INDEX NO.	DIGITRONICS PART NO.	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
		1 2 3 4 5 6 7		
-1-	DC8300-1	PAPER TAPE PUNCH, Model P135-20, vertical mounting	1	A
	DC8300-3	PAPER TAPE PUNCH, Model P135-35, vertical mounting	1	B
-1	10-3-224	. COVER, Solenoid mounting plate. (L) (ATTACHING PARTS)	1	
-2	TH-SI0802	. SCREW, Machine, pan hd, No. 4-40 x 3/16 in. lg.	3	
-3	TH-WC0407	. WASHER, Lock, int tooth, No. 4 ----*----	3	
-4	10-3-225	. COVER, Solenoid mounting plate (R) (ATTACHING PARTS)	1	
-5	TH-SI0802	. SCREW, Machine, pan hd, No. 4-40 x 3/16 in. lg.	3	
-6	TH-WC0407	. WASHER, Lock, int tooth, No. 4 ----*----	3	
-7	92405	. MOUNT, Shock (ATTACHING PARTS)	4	
-8	TH-WA0712	. WASHER, Flat, plain, No. 8	8	
-9	10-3-192	. NUT, Hex, dbl. chfr. No. 8	4	
-10	TH-WA0712	. WASHER, Split, light, No. 8 ----*----	4	
-11	40-3-069	. PLATE, Name	1	
-12	10-3-233	. COVER, Front	1	
-13	10-3-234	. COVER, Rear	1	
-14	10-426	. COVER, Chad (ATTACHING PARTS)	1	
-15	TH-SE1204	. SCREW, Machine, fil hd, No. 6-32 x 5/16 in. lg. ----*----	1	
-16	10-469-3	. PUNCH PIN AND DIE ASSEMBLY, 6 level in line	1	C
	10-469-4	. PUNCH PIN AND DIE ASSEMBLY, 6 level advanced sprocket	1	D
	10-469-1	. PUNCH PIN AND DIE ASSEMBLY, 8 level in line	1	E
	10-469-2	. PUNCH PIN AND DIE ASSEMBLY, 8 level advanced sprocket	1	F
	10-469-5	. PUNCH PIN AND DIE ASSEMBLY, 8 level fan fold (ATTACHING PARTS)	1	G
-17	10-3-268-1	. . DIE AND GUIDE ASSEMBLY, 8 level in line	1	C
	10-3-268-4	. . DIE AND GUIDE ASSEMBLY, 8 level advanced sprocket	1	D
	10-3-268-13	. . DIE AND GUIDE ASSEMBLY, 8 level fan fold	1	G
	10-3-268-1	. . DIE AND GUIDE ASSEMBLY, 6 level in line	1	E
	10-3-268-3	. . DIE AND GUIDE ASSEMBLY, 6 level advanced sprocket	1	F
-18	10-446-2	. . PIN, Punch, sprocket	1	
	10-446-1	. . PIN, Punch, data	6	C, D
	10-446-1	. . PIN, Punch, data	8	E, F, G
-19	TH-SI1209	. SCREW, Machine, pan hd, No. 6-32 x 3/4 in. lg.	1	
-20	TH-WB0605	. WASHER, Lock, split, light, No. 6	2	
-21	TH-WA0612	. WASHER, Flat, plain, No. 6	2	
-22	TH-SI1207	. SCREW, Machine, pan hd, No. 6-32 x 1/2 in. lg. ----*----	1	
-23	10-3-32	. GUIDE, Paper edge	1	C, E, F, G
	10-3-291	. GUIDE, Paper edge (ATTACHING PARTS)	1	D
-24	TH-SI0803	. SCREW, Machine, pan hd, No. 4-40 x 1/4 in. lg. ----*----	1	
-25	CAR0101	. TABLE (ATTACHING PARTS)	1	
-26	TH-SI1405	. SCREW, Machine, pan hd, No. 8-32 x 3/8 in. lg.	2	
-27	TH-WB0708	. WASHER, Lock, split, light, No. 8	2	
-28	TH-WA0712	. WASHER, Flat, plain, No. 8 ----*----	2	
-29	10-3-156	. ARM ASSEMBLY, Paper tension (ATTACHING PARTS)	1	
-30	TTRFA1204	. RING, Retaining	1	
-31	TTRFA1210	. RING, Retaining ----*----	2	

FIG & INDEX NO.	DIGITRONICS PART NO.	1 2 3 4 5 6 7	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
6-1-32	10-3-64	. .	PAPER GUIDE, Adjustable (ATTACHING PARTS)	1	
-33	TH-S11001	. .	SCREW, Machine, pan hd, No. 5-40 x 1/8 in. lg.	1	
-34	TH-WB0504	. .	WASHER, Lock, split, light, No. 5 -----*	1	
-35	10-3-67	. .	ARM ASSEMBLY, Paper tension	1	
-36					
-37	TH-S11207	. .	SCREW, Machine, pan hd, No. 6-32 x 1/2 in. lg.	1	
-38	TH-WB0605	. .	WASHER, Lock, Split, Light, No. 6	1	
-39	TH-WA0612	. .	WASHER, Flat, Plain, No. 6 -----*	1	
-40	10-3-205	. .	BLOCK, Mounting (ATTACHING PARTS)	1	
-41	TH-S11409	. .	SCREW, Machine, pan head, No. 8-32 x 3/4 in. lg.	2	
-42	TH-WB0708	. .	WASHER, Lock, split, light, No. 8	2	
-43	TH-WA0712	. .	WASHER, Flat, plain, No. 8 -----*	2	
-44	10-3-62	. .	LINK, Paper tension arm (ATTACHING PARTS)	1	
-45	TTRFM1206	. .	RING, Retaining -----*	2	
-46	BC0741-1	. .	HOLD DOWN ASSEMBLY, Paper (ATTACHING PARTS)	1	
-47	TTRFA1210	. .	RING, Retaining -----*	2	
-48	10-3-183	. .	KNOB (ATTACHING PARTS)	1	
-49	90213-1	. .	SETSCREW, No. 6-32 x 1/8 in. lg. -----*	1	
-50	10-3-173	. .	COLLAR, Shaft (ATTACHING PARTS)	2	
-51	90261	. .	SETSCREW, No. 10-32 x 1/8 in. lg. -----*	2	
-52	10-3-12	. .	SPROCKET, 24 tooth (ATTACHING PARTS)	1	
-53	TTACB0302	. .	PIN, Roll 5/64 dia. x 3/8 in. lg.	1	
-54	90226-1	. .	SETSCREW, No. 5-40 x 1/8 in. lg. -----*	1	
-55	10-382	. .	LABEL, Caution	2	
-56	10-3-86	. .	SPRING, Paper hold down	1	
-57	10-337	. .	SWITCH AND ACTUATOR ASSEMBLY (ATTACHING PARTS)	1	
-58	TH-S10803	. .	SCREW, Machine, pan hd, No. 4-40 x 1/4 in. lg.	2	
-59	TH-WB0403	. .	WASHER, Lock, split, light, No. 4	2	
-60	TH-WA0409	. .	WASHER, Flat, plain, No. 4 -----*	2	
-61	91008	. .	MICRO-SWITCH	1	
-62	91002	. .	ACTUATOR-STRAIGHT	1	
-63	10-3-282	. .	BRACKET (ATTACHING PARTS)	1	
-64	NO NUMBER	. .	SCREW, Machine (supplied with switch)	2	
-65	NO NUMBER	. .	WASHER, Lock, split (supplied with switch) -----*	2	
-66	10-3-261	. .	SPRING, Paper tension	1	
-67	10-3-57	. .	PIVOT, Paper tension arm (ATTACHING PARTS)	1	
-68	TH-S10803	. .	SCREW, Machine, pan hd, No. 4-40 x 1/4 in. lg.	1	
-69	TH-WB0403	. .	WASHER, Lock; split, light, No. 4	1	
-70	TH-WA0409	. .	WASHER, Flat, plain, No. 4 -----*	1	

FIG & INDEX NO.	DIGITRONICS PART NO.	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
		1 2 3 4 5 6 7		
6-1-71	CCA8369-1	. SOLENOID ASSEMBLY, Data, 12V Model P135-20	A/R	A
	CCA8369-3	. SOLENOID ASSEMBLY, Data, 27V Model P135-20	A/R	A
	CCA8369-3	. SOLENOID ASSEMBLY, Data, 27V Model P135-35	A/R	B
	CCA8369-5	. SOLENOID ASSEMBLY, Data, 48V Model P135-20	A/R	A
	CCA8369-5	. SOLENOID ASSEMBLY, Data, 48V Model P135-35	A/R	B
		(ATTACHING PARTS)		
-72	10-3-204	. SCREW, Mod., 5/16 - 24	A/R	
-73	10-332	. SCREW, Mod., No. 5-40	A/R	
-74	TTRFM1206	. RING, RETAINING	A/R	
		---*---		
-75	CX330-1	. PLATE ASSEMBLY, Front	1	
		(ATTACHING PARTS)		
-76	TH-SL1206	. SCREW, Soc hd, No. 6-32 x 7/16 in. lg.	4	
-77	TH-WB0605	. WASHER, Lock, split, light, No. 6	4	
		---*---		
-78	DCA8368-3	. HAMMER ASSEMBLY, 6 level, right and left	1	H
	DCA8368-1	. HAMMER ASSEMBLY, 8 level, right and left	1	I
		(ATTACHING PARTS)		
-79	TH-SI0803	. . SCREW, Machine, pan hd, No. 4-40 x 1/4 in. lg.	3	
-80	TH-WB0403	. . WASHER, Lock, split, No. 4	3	
-81	TH-WA0409	. . WASHER, Flat, plain, No. 4	3	
-82	TH-SE0803	. . SCREW, Machine, fil hd, No. 4-40 x 1/4 in. lg.	1	
		---*---		
-83	CXA397-1	. . HAMMER ASSEMBLY, Punch, No. 1	1	H
-84	CXA398-1	. . HAMMER ASSEMBLY, Punch, No. 2	1	I
-85	CXA409-1	. . HAMMER ASSEMBLY, Punch, No. 3	1	I
-86	CXA408-1	. . HAMMER ASSEMBLY, Punch, No. 4	1	I
-87	CXA403-1	. . HAMMER ASSEMBLY, Punch, No. 5	1	
-88	CXA396-1	. . HAMMER ASSEMBLY, Punch, No. 6	1	
-89	CXA399-1	. . HAMMER ASSEMBLY, Punch, No. 7	1	
-90	CXA401-1	. . HAMMER ASSEMBLY, Punch, No. 8	1	
-91	CXA405-1	. . HAMMER ASSEMBLY, (Sprocket Pin)	1	
-92	10-3-243-1	. . SPACER	1	
-93	10-3-243-2	. . SPACER	1	
-94	10-3-243-3	. . SPACER	1	
-95	10-3-243-4	. . SPACER	1	
-96	10-3-246	. . SPACER	1	
-97	10-3-247	. . SPACER, Sleeve, spacial (6 level, 7 level punch)	1	H
-98	10-3-243-5	. . SPACER (5 level, 6 level punch)	1	I
-99	10-3-243-6	. . SPACER (5 level punch)	1	
-100	90408-1	. . SPACER (SHIM)	A/R	
-101	90408-2	. . SPACER (SHIM)	A/R	
-102	90408-4	. . SPACER (SHIM)	A/R	
-103	10-3-343-1	. . SHAFT, PIVOT, HAMMER	1	
-104	10-3-343-2	. . SHAFT, PIVOT, HAMMER	1	
	TA-B00011	. . LUBRICANT	A/R	
-105	10-3-263	. STOP, Bail	1	
		(ATTACHING PARTS)		
-106	TH-SG0802	. SCREW, Machine, flat hd, No. 4-40 x 3/16 in. lg.	2	
		---*---		
-107	10-3-228	. PIVOT, Paper hold down	1	
		(ATTACHING PARTS)		
-108	TH-SI0803	. SCREW, Machine, pan hd, No. 4-40 x 1/4 in. lg.	1	
-109	TH-WB0403	. WASHER, Lock, split, light, No. 4	2	
-110	TH-WA0409	. WASHER, Flat, plain, No. 4	1	
		---*---		
-111	10-3-227	. SUPPORT, Shaft	1	
		(ATTACHING PARTS)		
-112	TH-SE0804	. SCREW, Machine, fil hd, No. 4-40 x 5/16 in. lg.	2	
-113	TH-WB0403	. WASHER, Lock, split, light, No. 4	2	
		---*---		
-114	10-3-232	. CHUTE, Chad	1	
		(ATTACHING PARTS)		
-115	TH-SI0807	. SCREW, Machine, pan hd, No. 4-40 x 1/2 in. lg.	2	

FIG & INDEX NO.	DIGITRONCIS PART NO.	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
		1 2 3 4 5 6 7		
6-1-116	TH-WB0403	. WASHER, Lock, split, light, No. 4	2	
-117	TH-WA0409	. WASHER, Flat, plain, No. 4	2	
		---*---		
-118	10-3-226	. BAR, Shock mounting (ATTACHING PARTS)	2	
-119	TH-SL1407	. SCREW, Soc hd, No. 8-32 x 1/2 in. lg	4	
-120	TH-WB0708	. WASHER, Lock, split, light, No. 8	4	
		---*---		
-121	91505	. CONNECTOR, 34 pin, plug (81312 P/N XAC34PF2006)	1	
-122	90134-3	. CONTACT, Removable (Plug)	30	A
	90134-3	. CONTACT, Removable (Plug)	20	B
-122A	91506	. CONNECTOR, Receptacle, 34 pin (81312, P/N MRAC 34 SJTDH) (not shown)		
-122B	90127-3	. CONTACT, Removable (Receptacle) (not shown)	1	
-123	90102	. TERMINAL, Lug (Ground)	1	
-124	10-430	. BRACKET, Connector (ATTACHING PARTS)	2	
-125	TH-SI1405	. SCREW, Machine, pan hd, No. 8-32 x 3/8 in. lg.	2	
-126	TH-WB0708	. WASHER, Lock, split, light, No. 8	2	
-127	TH-WA0712	. WASHER, Flat, plain, No. 8	1	
-128	TH-WC0710	. WASHER, External tooth, No. 8	1	
		---*---		
-131	10-3-812-2	. SUPPRESSION ASSEMBLY, Arc, negative voltage	1	B
	10-3-812-1	. SUPPRESSION ASSEMBLY, Arc, positive voltage (ATTACHING PARTS)	1	B
-132	TTACC1203	. PIN, Roll, 3/32 dia. x 7/16 in. lg.	2	B
-133	TH-SI0807	. SCREW, Machine, pan hd. No. 4-40 x 1/2 in. lg.	2	B
-134	TH-WB0403	. WASHER, Lock, split, light, No. 4	2	B
		---*---		
-135	91305	. . SEMICONDUCTOR DEVICE, Diode, zener (1N2810A)	3	B
-136	92700	. . MOUNTING KIT, Diode	3	B
-137	10-3-814	. . COMPONENT BOARD ASSEMBLY, Negative voltage (used on 10-3-812-1)	1	B
	10-839	. . COMPONENT BOARD ASSEMBLY, Positive voltage (used on 10-3-812-2) (ATTACHING PARTS)	1	B
-138	90207-4	. . SCREW, Machine, bind hd, No. 6-32	2	B
-140	90406-7	. . WASHER, Flat	2	B
		---*---		
-141	91308	. . . SEMICONDUCTOR DEVICE, Diode (1N645)	12	B
-142	10-3-87	. SPRING, Detent	1	
-143	10-402-1	. SLEEVE, Spring (Detent)	1	
-144	BC8299-1	. DETENT ARM ASSEMBLY (ATTACHING PARTS)	1	
-145	90227-7	. SCREW, Soc hd, No. 5-40 x 3/4 in. lg.	1	
-146	10-3-373	. WASHER, Flat, plain, No. 5	1	
		---*---		
-147	10-447	. . ARM, Detent	1	
-148	10-448	. . ROLLER, Detent	1	
	TA-B00011	. . LUBRICANT (ATTACHING PARTS)	A/R	
-149	TTRFA1206	. . RING, Retaining ---*---	2	
-150	10-449	. ECCENTRIC, Detent	1	
-151	10-462-1	. SOLENOID ASSEMBLY, Transport, left hand, 12V	1	A
	10-462-5	. SOLENOID ASSEMBLY, Transport, left hand, 27V	1	A
	10-462-5	. SOLENOID ASSEMBLY, Transport, left hand, 27V	1	B
	10-462-9	. SOLENOID ASSEMBLY, Transport, left hand, 48V	1	A
	10-462-9	. SOLENOID ASSEMBLY, Transport, left hand, 48V	1	B

FIG & INDEX NO.	DIGITRONICS PART NO.	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
		1 2 3 4 5 6 7		
		(ATTACHING PARTS)		
6-1-152	TH-SI1405	. SCREW, Machine, pan hd, No. 8-32 x 3/8 in. lg.	2	
-153	TH-WB0708	. WASHER, Lock, split, light, No. 8	2	
-154	TH-WA0712	. WASHER, Flat, plain, No. 8	2	
-155	TTRFA1206	. RING, Retaining	2	

-156	10-462-2	. SOLENOID ASSEMBLY, Transport, right hand, 12V	1	A
	10-462-6	. SOLENOID ASSEMBLY, Transport, right hand, 27V	1	A
	10-462-6	. SOLENOID ASSEMBLY, Transport, right hand, 27V	1	B
	10-462-10	. SOLENOID ASSEMBLY, Transport, right hand, 48V	1	A
	10-462-10	. SOLENOID ASSEMBLY, Transport, right hand, 48V	1	B
		(ATTACHING PARTS)		
-157	TH-SI1003	. SCREW, Machine, pan hd, No. 5-40 x 1/4 in. lg.	2	
-158	TH-WB0504	. WASHER, Lock, split, light, No. 5	2	
-159	TH-WA0509	. WASHER, Flat, plain, No. 5	2	
-160	TTRFA1206	. RING, Retaining	1	

-161	10-3-17	. . BRACKET, Drive solenoid (R. H. and L. H.)	2	
		(ATTACHING PARTS)		
-162	TH-SI1003	. . SCREW, Machine, pan hd, No. 5-40 x 1/4 in. lg.	4	
-163	TH-WB0504	. . WASHER, Lock, split, light, No. 5	4	
-164	TH-WA0509	. . WASHER, Flat, plain, No. 5	4	

-165	BA7909-1	. STOP, Pawl	1	
-166	BA7911-1	. ECCENTRIC, Pawl stop	1	
		(ATTACHING PARTS)		
-167	TH-SL1208	. SCREW, Soc hd, No. 6-32 x 5/8 in. lg.	1	
-168	TH-WB0605	. WASHER, Lock, split, light, No. 6	1	
-169	TH-WA0612	. WASHER, Flat, plain, No. 6	1	

-170	AXR0068-1	. CAM, Pawl Stop (insep. assy)	1	
		(ATTACHING PARTS)		
-171	TH-SI0805	. SCREW, Machine, pan hd, No. 4-40 x 3/8 in. lg.	1	
-172	TH-WB0403	. WASHER, Lock, split, light, No. 4	1	
-173	TH-WA0409	. WASHER, Flat, plain, No. 4	1	

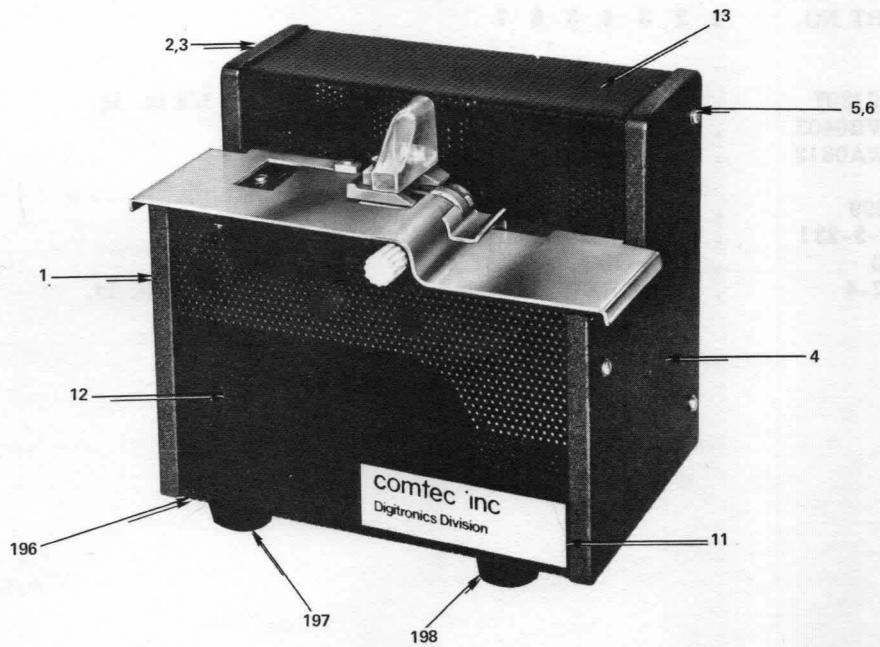
-174	43-068	. PAW ASSEMBLY	1	
-175	10-3-88	. . SPRING	1	
-176	TTADAK003	. . PIN, Dowel (90312-2)	1	
-177	10-3-37-1	. . PAWL	1	
-178	43-087	. . BRAZED ARM ASSEMBLY	1	
-179	10-367-1	. RATCHET ASSEMBLY	1	
-180	10-3-36	. . RATCHET	1	
		(ATTACHING PARTS)		
-181	TTABCF003	. . PIN	1	
-182	10-344-1	. . SHAFT	1	
-183	TTRFA1213	. RING RETAINING	1	

-184	DX328	. PLATE, Solenoid mounting, (R)	1	
		(ATTACHING PARTS)		
-185	TH-SL1407	. SCREW, Soc hd, No. 8-32 x 1/2 in. lg.	2	
-186	TH-WB0708	. WASHER, Lock, split, light, No. 8	2	

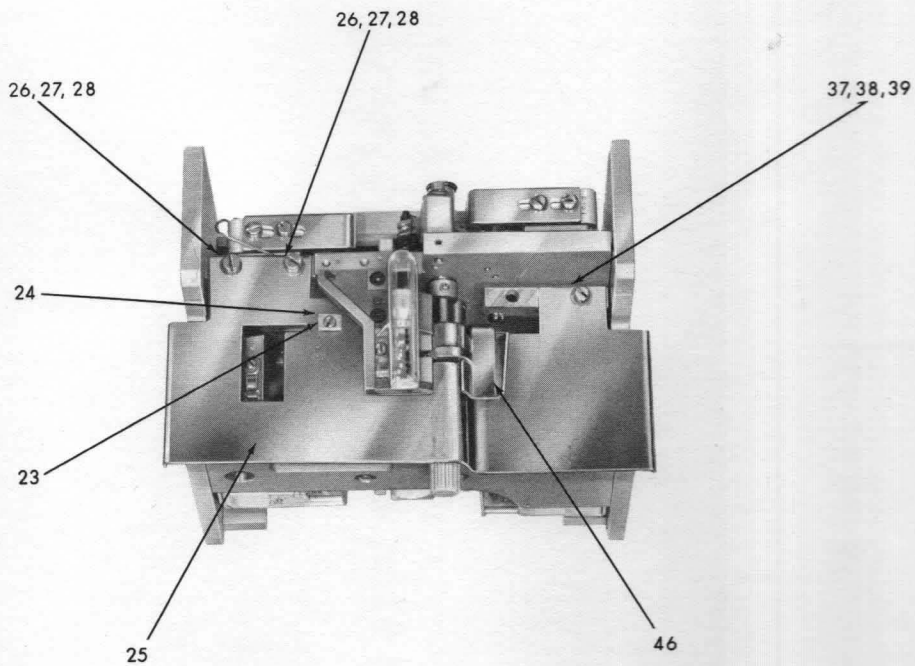
-187	DX327	. PLATE, Solenoid mounting, (L)	1	
		(ATTACHING PARTS)		
-188	TH-SL1407	. SCREW, Soc hd, No. 8-32 x 1/2 in. lg.	2	
-189	TH-WB0708	. WASHER, Lock, split, light, No. 8	2	

-190	CX329-1	. PLATE ASSEMBLY, Mounting	1	
-191	10-463-3	. SOLENOID ASSEMBLY, Bail Restoring, 12V	2	A
	10-463-3	. SOLENOID ASSEMBLY, Bail Restoring, 27V	2	A B
	10-463-5	. SOLENOID ASSEMBLY, Bail Restoring, 48V	2	A B

FIG & INDEX NO.	DIGITRONICS PART NO.	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
									(ATTACHING PARTS)		
-192	TH-SI1207	.							SCREW, Machine, pan hd, No. 6-32 x 1/2 in. lg.	2	
-193	TH-WB0403	.							WASHER, Lock, split, light, No. 4	2	
-194	TH-WA0612	.							WASHER, Flat, plain, No. 6	2	
									-----*		
-195	CA4899	.							PLATE, Identification	1	
-196	C-10-3-231	.							BASE PLATE, Vert. Mgt. (desk top)	1	
-197	92400	.							FOOT, RUBBER	4	
-198	90207-4	.							SCREW, Machine, Hd. No. 6-32 x 5/16 in. lg.	4	

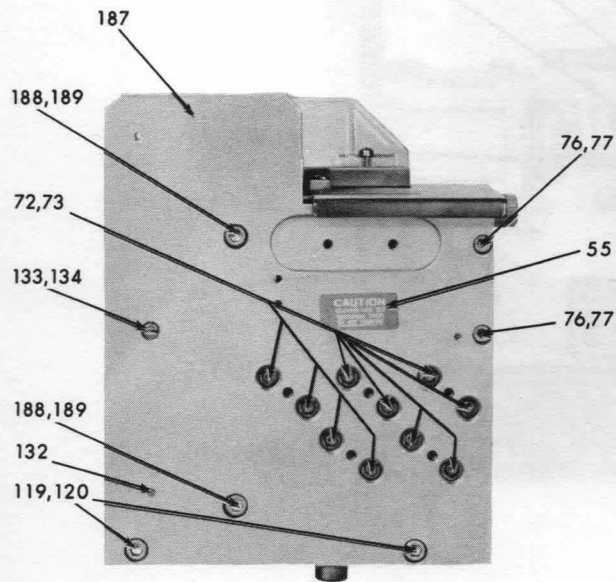


3/4 Front View

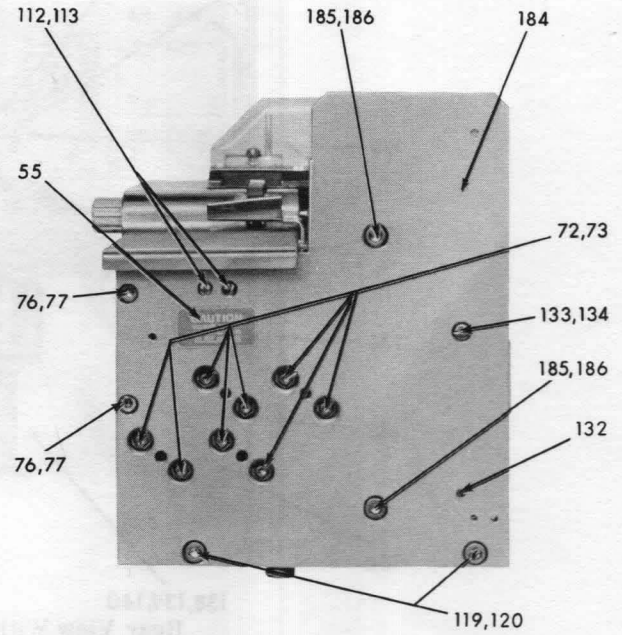


Front View A (With Table)

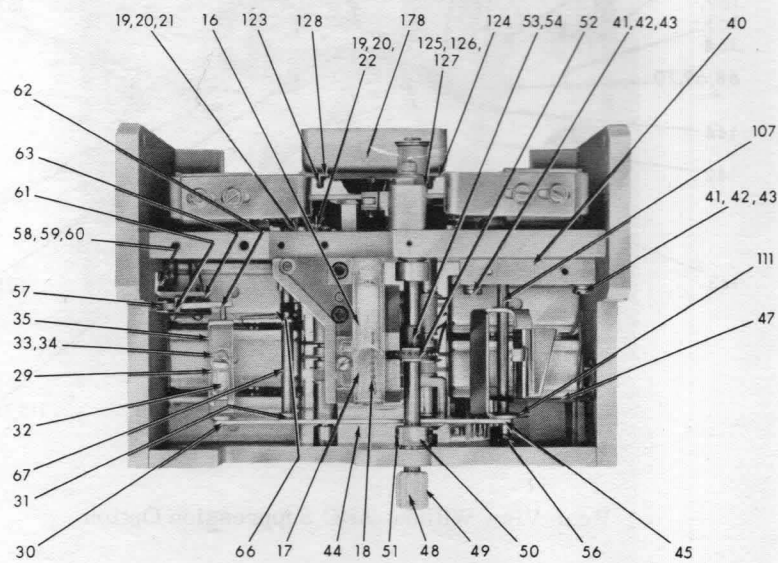
Figure 6-1 P135 Punch (Sheet 1 of 4)



Left Hand Side View



Right Hand Side View



Front View B (Without Table)

Figure 6-1 P135 Punch (Sheet 2 of 4)

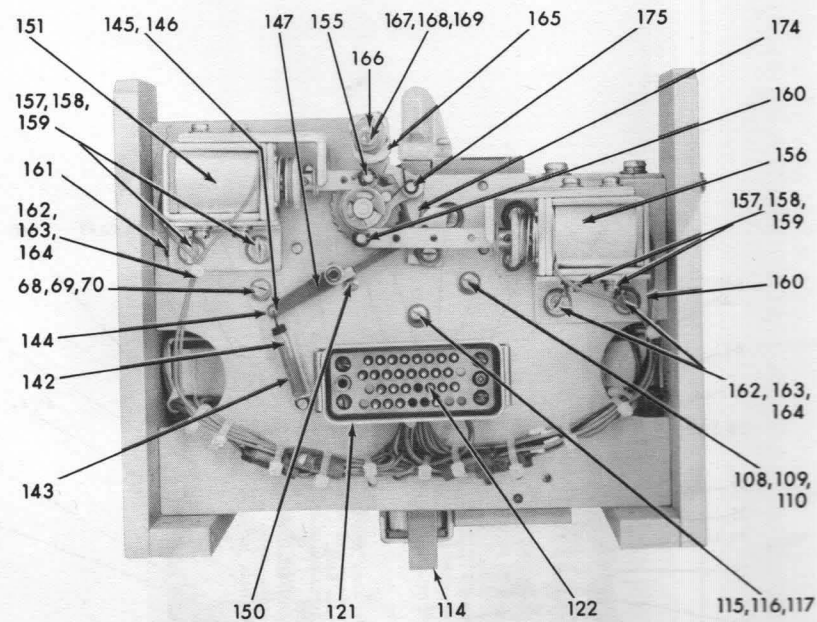
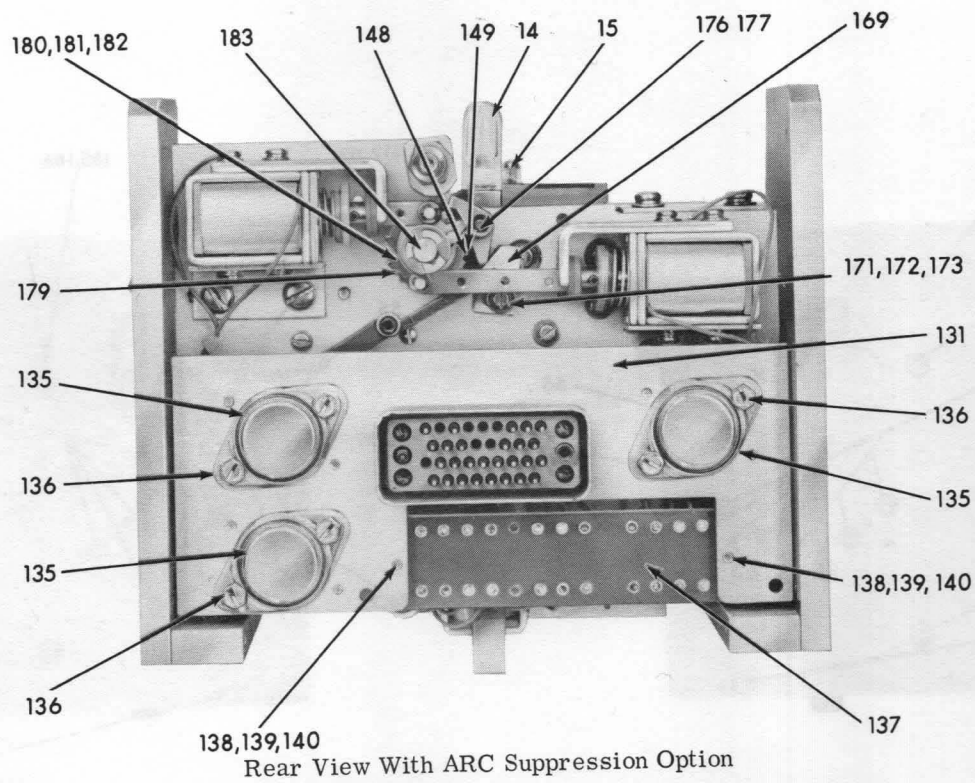
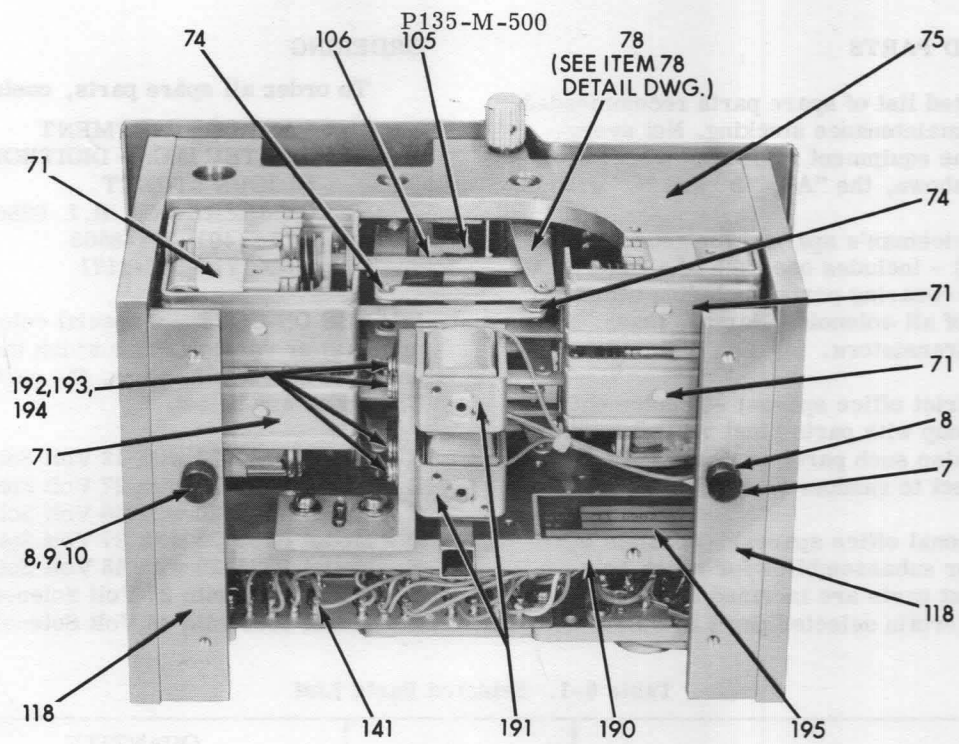
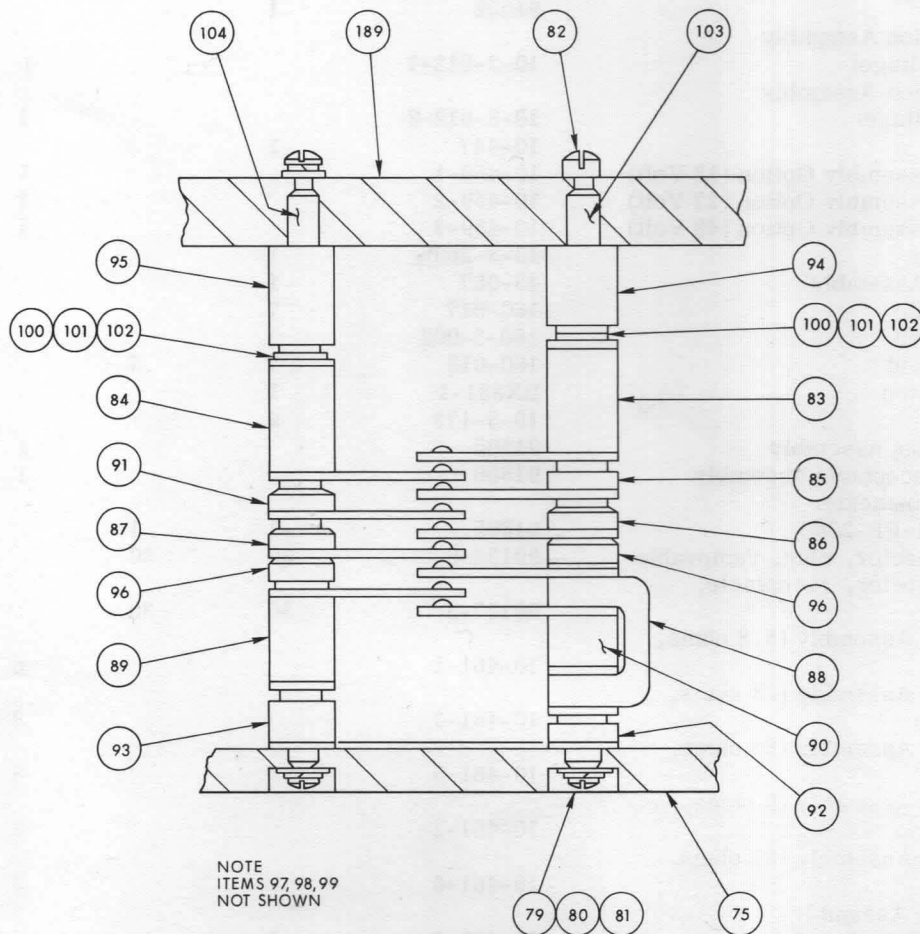


Figure 6-1 P135 Punch (Sheet 3 of 4)



Bottom View



Item 78 Detail Drawing - Hammer Assembly

Figure 6-1 P135 Punch (Sheet 4 of 4)

6.8 SELECTED PARTS

ORDERING

This is a selected list of spare parts recommended for repair and maintenance stocking. Not every component of the equipment is listed. Three stocking levels are shown, the "A", "B" and "C" groups.

To order all spare parts, contact:

PARTS DEPARTMENT
COMTEC INC. - DIGITRONICS DIV.
53 JOHN STREET
CUMBERLAND, R.I. 02864
TEL: (401) 724-8503
TWX: 710-387-1171

A GROUP (Serviceman's spares, for general maintenance) - includes one each of all mechanically-wearing parts (including bearings), and of all solenoids, lamps, fuses, diodes and transistors.

B GROUP (District office spares) - supplements the A group with parts most subject to wear, and also such parts as power transformers, subject to random or rare failure.

C GROUP (National office spares) - consists of major subassemblies for which component parts are included in groups A and B. Certain selected parts are also included.

USABLE ON CODE - a special column defining the model(s) or version(s) for which the part may be used. If no entry is given, the part is for all units. The codes are below.

A - Model P135-20 with 12 Volt Solenoids
B - Model P135-20 with 27 Volt Solenoids
C - Model P135-20 with 48 Volt Solenoids
D - Model P135-35 with 27 Volt Solenoids
E - Model P135-35 with 48 Volt Solenoids
F - Model 1560 with 27 Volt Solenoids
G - Model 1560 with 48 Volt Solenoids

Table 6-1. Selected Parts List

DESCRIPTION	PART NO.	QUANTITY			USABLE ON CODE
		A Group	B Group	C Group	
***Actuator	91002	1			
Arc Suppression Assembly (Negative Voltage)	10-3-812-1			1	D, E
Arc Suppression Assembly (Positive Voltage)	10-3-812-2			1	D, E
Arm, detent	10-447	1			
Back Space Assembly Option (12 Volt)	10-459-1			1	A
Back Space Assembly Option (27 Volt)	10-459-2			1	B, D, F
Back Space Assembly Option (48 Volt)	10-459-3			1	C, E, G
Bail Assembly	10-3-265	1			A, B, C, D, E
Brazed Arm Assembly	43-087	1			
Buffer, plunger	160-017	7			
Buffer, plunger	160-3-002	9			
Buffer, solenoid	160-013	7	7		
Cam, pawl, stop	BX331-1	1			
Collar, shaft	10-3-173	2			
Connector, plug assembly	91505			1	
Connector, receptacle assembly	91506			1	
Connector (Winchester P/N XAC-34-PF-2006)	91505	1	1		
Contact, connector, plug, removable	90134-3	30	30		
Contact, connector, receptacle, removable	90127-3	30	30		
Data Solenoid Assembly (5.8 ohms, 12 Volts)	10-461-1			8	A
Data Solenoid Assembly (23 ohms, 27 Volts)	10-461-3			8	B, D
Data Solenoid Assembly (85 ohms, 48 Volts)	10-461-5			8	C, E
Data Solenoid Assembly (9 ohms, 27 Volts)	10-461-2			8	F
Data Solenoid Assembly (23 ohms, 48 Volts)	10-461-6			8	G
Die and Guide Assembly (6 level in line)	10-469-3	1			

***On units with optional End-of-Tape switch assembly

Table 6-1. Selected Parts List (Cont.)

DESCRIPTION	PART NO.	QUANTITY			USABLE ON CODE
		A Group	B Group	C Group	
Die and Guide Assembly (6 level advanced sprocket)	10-469-4	-			
Die and Guide Assembly (8 level in line)	10-469-1	1			
Die and Guide Assembly (8 level advanced sprocket)	10-469-2	1			
Die and Guide Assembly (8 level Fan Fold)	10-469-5	1			
Diode (1N2810A)	91305	3	3		D, E
Diode (1N645)	91308	12	12		D, E
Hammer No. 1 Assembly	10-3-107	1			
Hammer No. 2 Assembly	10-3-106	1			
Hammer No. 3 Assembly	10-3-112	1			
Hammer No. 4 Assembly	10-3-111	1			
Hammer No. 5 Assembly	10-3-110	1			
Hammer No. 6 Assembly	10-3-257	1			
Hammer No. 7 Assembly	10-3-108	1			
Hammer No. 8 Assembly	10-3-255	1			
Hammer Assembly, 6-level	DC8302-3				
Hammer Assembly, 8-level	DC8302-1				
Hammer Assembly, sprocket	10-3-109	1			
*Link	AA7916-1	1			
Link (0.811 inch)	10-381-5	1			
Link (1.843 inches)	10-381-4	1			
Link (2.175 inches)	10-381-3	7			
Link, bail, restoring	10-3-236	2			A, B, C, D, E
Link, paper tension arm	10-3-62	1			
Paper Hold Down Assembly	10-458	1			
*Pawl Arm Assembly	10-410	1			
*Pawl Drive Assembly	BC8307-1	1			
*Pawl, modified	10-3-37-2	1			
Pawl	10-3-37	1			
Pivot, paper hold down	BC0741-1	1			
Pivot, tension arm	10-3-57	1			
Ratchet	10-3-36	1			
Roller, detent	10-448	1	1		
**Roller, tension, tape	80-3-108	2	2		
Restoring Bail Assembly (5.8 ohms)	10-463-1			1	
Restoring Bail Assembly (23 ohms)	10-463-3			1	A
Restoring Bail Assembly (85 ohms)	10-463-5			1	B, D
Shaft, pivot, hammer	10-343-1	1			
Shaft, pivot, hammer	10-343-2	1			
Solenoid and Plunger (5.8 ohms)	160-3-005-1	15	15		A
Solenoid and Plunger (23 ohms)	160-3-005-2	15	15		D, B, G
Solenoid and Plunger (85 ohms)	160-3-005-4	15	15		C, E
Solenoid and Plunger (9 ohms)	160-3-005-5	15	15		F
Spring	10-3-88	1	1		
Spring, detent	10-3-87	1	1		
Spring, paper hold down	10-3-261	1	1		
Spring, paper tension	10-3-261	1	1		
Spring, solenoid	260-3-001	7			
*Spring, solenoid	260-3-002	1			
**Spring, tension	83-154	1	1		
Sprocket, 24 tooth	10-3-12	1			
Stop, bail	10-3-263	1			
Stop, hammer	10-342	1			
Stop, solenoid	10-3-75-3	7	7		

*On units with optional back space assembly
**On units with optional tape tension assembly

Table 6-1. Selected Parts List (Cont.)

DESCRIPTION	PART NO.	QUANTITY			USABLE ON CODE
		A Group	B Group	C Group	
Switch Assembly, End-of-Tape (optional)	10-337			1	C, E
Switch, micro	91008	1	1		
***Switch, micro	91008	1			
Tape Tension Assembly (optional)	83-151-1			1	
Transport Solenoid Assembly, Left Hand Side (5.8 ohms)	10-462-1			1	
Transport Solenoid Assembly, Left Hand Side (85 ohms)	10-462-9			1	A
Transport Solenoid Assembly, Left Hand Side (23 ohms)	10-462-5			1	C, E
Transport Solenoid Assembly, Left Hand Side (9 ohms)	10-462-3			1	B, D, G
Transport Solenoid Assembly, Right Hand Side (5.8 ohms)	10-462-2			1	F
Transport Solenoid Assembly, Right Hand Side (23 ohms)	10-462-6			1	A
Transport Solenoid Assembly, Right Hand Side (85 ohms)	10-462-10			1	B, D, G
Transport Solenoid Assembly, Right Hand Side (9 ohms)	10-462-4			1	C, E, F

***On units with optional End-of-Tape switch assembly

APPENDIX A

MANUFACTURING SPECIFICATIONS

The Manufacturing Specification (MS) number, located on the equipment nameplate, presents in skeleton form the specification to which the equipment was manufactured. It identifies the speed of the unit, type of head assembly, etc. From this MS number, you can readily determine the major characteristics and assembly part numbers of your particular unit by comparing it with the detailed Manufacturing Specifications provided on the following page. Use the following as a guide for interpreting the characteristics of your unit from the MS number.

MS number from nameplate P135 - A3 - B3 - C4 - D7 - E1 - G1 - H1 - J1 - L4 - M1 - N1

A3	Model P135-35 Basic Unit, vertical mounting
B3	8 level Die and Punch Pins, 8 level Hammer Assembly
C4	Data Solenoid 27v, Transport Solenoid (R) 27v, (L) 27v, Restoring Bail Assembly 27v
D7	27 volt vertical mounting
E1	Arc Suppression Assembly, wiring diagram positive polarity
G1	Cover Solenoid Mounting Plate (L), (R), front, rear
H1	Base Plate, vertical mounting (desktop)
J1	Baked enamel, black
L4	Connect or receptacle assembly and pins
M1	Shipping carton
N1	Maintenance Manual

APPENDIX A (Cont'd.)
MANUFACTURING SPECIFICATION MS2540

ITEM	MODEL	DESCRIPTION	DWG. NUMBER
A		Basic Punch	
A1	P135-20	Vertical Mounting	DC8300-1
A2		Horizontal Mounting	DC8300-2
A3	P135-35	Vertical Mounting (Only)	DC8300-3
A4	1560	Vertical Mounting	DC8300-4
A5		Horizontal Mounting	DC8300-5
A6	(PKP) P135-20	Vertical Mounting (Only)	DC8300-6
A7	(PK-DI) P135-20	Vertical Mounting (Only)	DC8300-7
B		Die and Guide Assembly	
B1		6 Level Die and Punch Pins	A-10-469-3
B2		6 Level Hammer Assembly	DCA8368-3
B3		6 Level Adv. Spkt. Die and Punch Pins	A-10-469-4
B4		6 Level Hammer Assembly	DCA8368-3
B5		8 Level Die and Punch Pins	A-10-469-1
B6		8 Level Hammer Assembly	DCA8368-1
B7		8 Level Adv. Spkt. Die and Punch Pins	A-10-469-2
B8		8 Level Hammer Assembly	DCA8368-1
B9		8 Level Fan Fold Die and Punch Pins	A-10-469-5
B10		8 Level Hammer Assembly	DCA8368-1
C		Solenoids	
C1	P135-20	Data Solenoid Assembly 12V	CCA8369-1*
		Transport Solenoid Assembly (R) 12V	B-10-462-2
		Transport Solenoid Assembly (L) 12V	B-10-462-1
		Restoring Bail Assembly 12V	B-10-463-1
C2		Data Solenoid Assembly 27V	CCA8369-3*
		Transport Solenoid Assembly (R) 27V	B-10-462-6
		Transport Solenoid Assembly (L) 27V	B-10-462-5
		Restoring Bail Assembly 27V	B-10-463-3
C3		Data Solenoid Assembly 48V	CCA8369-5*
		Transport Solenoid Assembly (R) 48V	B-10-462-10
		Transport Solenoid Assembly (L) 48V	B-10-462-9
		Restoring Bail Assembly 48V	B-10-463-5
C4	P135-35	Data Solenoid Assembly 27V	CCA8369-3*
		Transport Solenoid Assembly (R) 27V	B-10-462-6
		Transport Solenoid Assembly (L) 27V	B-10-462-5
		Restoring Bail Assembly 27V	B-10-463-3
C5		Data Solenoid Assembly 48V	CCA8369-5
		Transport Solenoid Assembly (R) 48V	B-10-462-10
		Transport Solenoid Assembly (L) 48V	B-10-462-9
		Restoring Bail Assembly 48V	B-10-463-5
		<p><u>*NOTE</u></p> <p>Data Solenoid Assembly Quantity is equal to "B" option level plus one.</p>	
D		Solenoid Voltage Options	
D1	P135-20	12 Volt Vertical Mounting	C-10-459-1
D2		12 Volt Horizontal Mounting	C-10-459-4
D3		27 Volt Vertical Mounting	C-10-459-2
D4		27 Volt Horizontal Mounting	C-10-459-5
D5		48 Volt Vertical Mounting	C-10-459-3
D6		48 Volt Horizontal Mounting	C-10-459-6
D7	P135-35	27 Volt Vertical Mounting	C-10-459-2
D8		48 Volt Vertical Mounting	C-10-459-3

APPENDIX A (Cont'd.)
MANUFACTURING SPECIFICATION MS2540

ITEM	MODEL	DESCRIPTION	DWG. NUMBER
D9 D10 D11 D12	1560	27 Volt Vertical Mounting 27 Volt Horizontal Mounting 48 Volt Vertical Mounting 48 Volt Horizontal Mounting	C-10-459-2 C-10-459-5 C-10-459-3 C-10-459-6
E		Electronic Options	
E1 E2		Arc Suppression Assembly Wiring Diagram Position Polarity Arc Suppression Assembly Wiring Diagram Neg. Polarity	B-10-3-812-2 DK1276-3 B-10-3-812-1 DK1276-4
F1		Tape Tension Assembly (Double Roller) Screw, Pan Hd. #6-32x5/16 Lg. Washer, Lock Split #6 Washer, Flat #6 Bracket, Mounting Nut, #6-32	B-83-151-1 TH-SI1204 TH-WB0605 TH-WA0612 B-80-3-120 TH-NA1106
G		Covers	
G1 G2 G3	Vertical Mounting Horizontal Mounting	Cover, Solenoid Mounting Plate (R) Cover, Solenoid Mounting Plate (L) Cover, Rear Cover, Front Cover, Solenoid Mounting Plate (R) Cover, Solenoid Mounting Plate (L) Cover, Rear Model Cover, Front No Covers	C-10-3-225 C-10-3-224 C-10-3-234 C-10-3-233 C-10-3-225 C-10-3-224 C-10-431 C-10-3-233
H		Mounting	
H1 H2 H3 H4		Base Plate, Vertical Mounting (Desk Top) Rack Mounting Bracket Vertical Mounting Unit Washer, Flat #8 Shock Mounting Stud Model Vertical Mounting Unit, Mounting Studs and Hardware Only Washer, Flat #8 Shock Mounting Stud Model Horizontal Mounting Unit, w/Rack Mounting Bracket	C-10-3-231 C-80-3-260-1 TH-WA0712 A-10-3-192 TH-WA0712 A-10-3-192 C-80-3-260-2
J		Paint	
J1 J2		Baked Enamel - Black Primed, Paint Per W/O	P-171
		Miscellaneous Options	
K1 L1 L2 L3 L4		(PKP-Option) Switch and Actuator Assembly Rack Adapter Tape Deflector (Fan Fold) TPS-87, Supply and Chad Draw Desk Top Assembly Connector, Receptacle Assembly Connector, Receptacle Pins	B-10-337 B-87-04-001 DC8309-1 B-87-01-001 91506 90127-3

APPENDIX A (Cont'd.)
MANUFACTURING SPECIFICATION MS2540

ITEM	MODEL	DESCRIPTION	DWG. NUMBER
M		Shipping	
M1		Shipping Package Assembly	
N		Manuals	
N1		Manual	P135-M-500

APPENDIX B

CLAIM FOR DAMAGE IN SHIPMENT

The Punch Unit should be installed and tested as soon as it is received. If the unit is damaged in any way and fails to operate within the specified limits, a claim should be filed with the carrier. A full report of the damage should be obtained by your claim agent, and this report should then be forwarded to Comtec Inc. Comtec will then advise you of the proper disposition to be made and make arrangements for repair or replacement. The model number, type number, and serial number should be used when referring to this instrument for any reason.

WARRANTY

Comtec Inc. warrants that all equipment, spare components and piece parts furnished hereunder will be free and clear of all liens and encumbrances, and that all such equipment, spare components and piece parts shall be free from defects in design, workmanship and material under normal use and service provided. However, no warranty is made with respect to any equipment when the unit or component parts have been altered or defaced or when modification has been made without the written consent of Comtec. No other warranty, either expressed or implied, is made by Comtec. If Comtec is advised within twelve months from date of delivery, to the customer, that component parts furnished do not meet the warranties hereunder, Comtec will supply replacement part(s) to the customer or will repair the defective part(s) at Comtec's factory service center. When Comtec elects to repair defective part(s) at main plant or factory service centers and Comtec has been advised of part(s) being defective within ninety (90) days from date of delivery of component part(s) to the customer, there will be no labor charge incurred. Mechanical and electrical items which are of an expendable nature, including (but not limited to) solenoid sleeves, pawl springs, and solenoid links are specifically excluded from this warranty; however, Comtec will extend to the customer any applicable warranty which Comtec may have received from its suppliers for such excluded items. If any fault develops in the equipment the following procedure should be followed:

1. Telephone Comtec at (401) 724-8500 Factory Service Center and provide full details of the difficulty; include the model number, type number, and serial number. On receipt of this information, we will give you a field return authorization number, service instructions and/or shipping instructions.
2. On receipt of shipping instructions, forward the instrument prepaid to the address given below, and repairs will be made at the factory service center. If the instrument is not covered by the warranty, and if requested, an estimate will be made prior to making any repairs.

Comtec Inc.
53 John Street
Cumberland, Rhode Island 02864
Attention: Factory Service Center
(401) 724-8500

SHIPPING

All shipments of Comtec instruments should be made via best way using proper packing. The instrument should be packed in the original shipping carton or (as a minimum) a wooden box, and should be packed and surrounded by 2 or 3 inches of excelsior or similar shock absorbing material.

THE STATE OF TEXAS, COUNTY OF DALLAS.

I, the undersigned, a Notary Public in and for the State of Texas, do hereby certify that the within and foregoing instrument is a true and correct copy of the original instrument filed for record in my office on this 1st day of January, 1901.

Notary Public.

Witness my hand and the seal of my office at Dallas, Texas, this 1st day of January, 1901.

Notary Public.

Attest my hand and the seal of my office at Dallas, Texas, this 1st day of January, 1901.

Notary Public.

Notary Public.

Notary Public.



Comtec Information Systems, Inc.
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